PREHISTORIC MAN AND HIS STORY

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G. F. SCOTT ELLIOT, M.A., B.Sc.

PITHECANTHROPUS ERECTUS, *DUBOIS*

The skull fragment found by Dr. Dubois in Java is of a creature almost exactly on the boundary line between man and the higher anthropoid apes

Restored according to the directions of Professor Rutot of Brussels

PREHISTORIC MAN
AND HIS STORY

A SKETCH OF THE HISTORY OF MANKIND FROM THE EARLIEST TIMES

BY

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PREFACE TO THE THIRD EDITION

THE story of mankind is a record of continual improvement. Starting from a condition not distinguishable from that of quite an ordinary low grade innocent sort of animal, our ancestors gradually became reasonable and moral human beings and we ourselves are still developing upwards.

Such at least is the theory which underlies this book. It should encourage us and justify a serene confidence for the future of humanity. The origins of the various steps upward in the long ascent from Pithecanthropus to this present period are for the most part mysterious and unexplained. But when they can be traced out, we find that it is moral, or more rarely intellectual qualities, and very seldom indeed brute force, that has been the prime mover in the great ascent of mankind.

The book was practically finished months before the war. To-day there is much pessimism in Europe; many are beginning to despair of humanity, and have grave doubts as to the future of Christianity, indeed of civilisation. There is no sound basis for these gloomy views. The whole of history and prehistory in Europe is full of the story of successive invasions of the Northern Race.

Sometimes they were quite successful, as when in prehistoric times Crete, Troy, Mycenæ, and other civilisations were blotted out. There were two successful invasions of Britain, first by the Saxons and then by the Danes; sometimes Italy, and even Spain, have been

occupied; provinces such as Normandy have been conquered and retained. The Vandals seized and held almost the whole of North Africa. On many occasions these invasions were not successful; Julius Cæsar crushed Vercingetorix; Napoleon carried war into Germany and Austria, after which there followed about half a century of peace.

But the defeat of the German hordes in 1918 was more crushingly complete than any other recorded in the whole of history, and prehistory, as far back as 3500 B.C. Yet this invasion was by far the most formidable of all of them; it was deliberately planned, cunningly and patiently organised during forty years of strenuous preparation. There was no difference in the aims of the German Authorities; they intended, just like their ancestors, to dominate and exploit the richer and feebler southern nations for their own material benefit. For this end they had schooled the younger generation and misrepresented religion.

Their defeat was accomplished by the courage, devotion to duty and patient endurance of millions of men, who had never dreamed of soldiering, yet who cheerfully enlisted and went through experiences more horrible than poor humanity has ever endured in the worst of bygone wars. Civilians also, men, women and children, the vast majority of the people in Britain, Belgium, France and Italy, suddenly realised that they had a country to work for and did their very best for it. The people of the United States who were not even threatened rallied to the cause of civilisation.

What reason then is there to doubt of the future of humanity? Devotion to duty triumphed over brute force. It is true that an appalling state of affairs in Eastern Europe and in Russia followed. Bolshevism, industrial and social unrest, are in the highest degree dangerous. The power of Bolshevism and the evil

influence of those who deliberately stir up hatred depends entirely upon ignorance, upon the crudest materialism and upon mere greed.

Persecution of Christians, nationalisation of women, abolition of private property, an alliance with the most fanatical adherents of the worn-out faith of Mahomed, are these ideals likely to rouse enthusiasm in the vast majority of European people?

This war has clearly brought out the fact that devotion to duty and unselfishness will assuredly overcome brute force. Lenin and Trotsky are hardly men of the calibre of Attila, or even of Robespierre. They are not likely to win when William II, with the whole force of Germany and Austria behind him, failed ignominiously.

It is true that we have real cause for discouragement in the exhibition of the modern German as scarcely different from his ancestors whether Sea Wolves, Lanzknechts, Goths or Vandals. He was up-to-date in modern science, thoroughly well informed, and able to make the best use of every horrible invention that trained brains could produce; his soldiers were full of courage, and patriotic after their manner.

But there is very little ground for pessimism in the fact that the defeat of the Germans can be directly traced to one fatal mistake. They deliberately broke the laws both of God and of man, and in so doing necessarily brought against themselves the whole strength of Christianity and civilisation.

There is no cause for depression in the fact that defeat was therefore, as it seems to us, inevitable.

The effect of this, the greatest of all wars, will resemble those of the past, another step forward and upward will result from it; even though it may not be in the days allotted to this unfortunate generation.

G. F. SCOTT ELLIOT.

1920.

Office of the
Director of Archaeology
Madras

INTRODUCTION

EVEN the most primitive people in the world have their theories on the origin of mankind, and the same elusive problem still has its fascination even for ourselves. We take a sort of fatherly interest in the struggles and hardships of our early ancestors, and the story itself is a record of fine achievements by which man, who was once hardly so comfortable as a squirrel or a chipmunk, rose to the peacefully luxurious condition which prevails, now and then, in most of Europe and in the United States. It is the most complicated of all stories, for in it is involved almost every science and the history of almost every art and craft in which man has every exercised himself. In consequence, the literature of the subject is enormous, and seems yearly to increase both in amount and in complexity.

The convenient word "anthropology" includes geological, anatomical, zoological, archæological, and ethnological questions or problems which are of extreme difficulty, and on many of which there is a radical difference in opinion; moreover, these are but a few of the sciences concerned. No one, however omnivorous his reading, could possibly learn and digest all the available literature.

However, during the last few years, the mists which obscured the story of mankind seem to be beginning to clear away, and it is now possible to trace more or less clearly the general course of his ascent. Naturally only a sort of large scale-map can be outlined, for undue persistence on unnecessary details would obscure the general scheme. It has often been impossible in the following pages to do justice to views and theories which are of great importance, partly for want of space and partly because mention of conflicting opinions would have hopelessly confused the narrative. But it seemed to me that the story of humanity was becoming quite incompre-

hensible to the ordinary educated reader, because of the very abundance of technical and often quite unintelligible information.

Mr. Waterman has an interesting legend current amongst the Diequeno Indians of California. These people were collected together to listen humbly and obediently to the Great Serpent. This snake, who had swallowed all learning, was going to teach them how to dance. But as he came coiling in through the roof, and continued to come in with an apparently endless series of coil after coil, they became thoroughly frightened at the indefinite amount of him, and hastily set fire to the house, and him.

It would surely be a great pity if ordinary intelligent readers could no longer follow comfortably the most interesting of all sciences, and we have therefore avoided technical terms wherever it was possible, and we have tried to keep the main outline clear and consecutive. I have endeavoured, as far as possible, to avoid repeating what has already been given in full detail in books of the same nature, and preferred foreign authorities as being less accessible to the general reader. It must also be remembered that to every question discussed in the following pages, there are not merely two, but several sides. The solution is always a matter of probability and balance of evidence. I have selected that solution which seems most satisfying, and which best explains the facts as at present known.

I have also to express my sincere thanks for kind permission to use various illustrations especially to M. Frobenius, M. l'Abbe Henry Breuil, Professor Rutot, Dr. Smith Woodward, M. Dharvent, M. Deonna, Dr. Duckworth, Mr. Fisher Unwin, the Editor of the *Illustrated London News*, of the Bureau of American Ethnology, and of L'Anthropologie, the Geological Society, Messrs. Pratt, Seler, Gomes, Hutton, and Swann. Also to Mr. Hitchcock of Laurieston School, and his young pupils McNeil and Proudlock.

G. F. SCOTT ELLIOT.

February, 1914.

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PREHISTORIC MAN AND HIS STORY

CHAPTER I

THE PREPARATION OF THE EARTH

THIS world, according to various eminent authorities, has endured for at least 20,000,000, or at most some 370,000,000 of years. The difference in these estimates is only what might be expected, for they are based on different data, and calculated by observers who were interested in different sciences.[1] We are, as good evolutionists, bound to believe that there was an ancestor of man from the first moment that life, of a sort, began to and exert itself in the archaic slimes and oozes of the very earliest world; but no one would agree to call by the name of Man such creatures as Amphioxus, worms, or even a reptile, however theriomorphic it may have been. Even a "little wailing lemur," in spite of an affectionate disposition, and, no doubt, many other engaging qualities, cannot be called Human.

Where, then, should we begin the story of the ascent of mankind? That is a very difficult question; indeed, very great harm has been done, and many violent controversies aroused, through a want of definition, which still confuses the issues and biases the reasoning even of some of the best of our authorities. There must have been a time when our ancestor had already developed the physique and bodily characteristics of a generalized *homo sapiens*, but had not yet grown into an intelligent being capable now and then of acts of human kindness. There

must also have been a long apprenticeship, during which finger and thumb, eye and brain, courage, prudence, family affections, and spiritual cravings acted and reacted on one another; all through this period the most rigorous selection was at work. That type only which remained adaptable, and had promise of the man that was to be succeeded in surviving.

There may have been many side-tracks of descent which promised immediate benefit to one series of descendants or another; but these, after great success in their own geological epoch, have disappeared, or may possibly be represented to-day by lemurs, living monkeys, or anthropoid apes. The point is, that the ancestor of mankind was once a soulless brute, and that a certain grade of intelligence and some sort of spiritual possibility are necessary specific characters of *homo sapiens*. At what period did he obtain these accomplishments? It is in the highest degree difficult to get any clear understanding of the intellectual status or moral character of beings whose remains consist of a jawbone, three teeth, or a few slightly chipped stones. Nevertheless, there is indirect evidence and some ingenious speculation, which must be noticed later (see p. 45).

If these considerations were neglected, the story of man's ascent would be essentially false. Had it not been for keen intelligence and some virtue, a creature equipped with such feeble weapons, whose young are quite helpless for at least three years, could never have managed to get through the cold horrors of four successive ages of Ice. We are never in doubt as to the essential humanity of any the lowest and least civilized living savage; but which entry on the long pedigree of our ancestors can be called the first man? We shall try in what follows to place all available evidence before the reader, but in this first chapter desire only to explain, so far as one can do so, the preliminary stages in the preparation of the earth.

True mammals only begin to appear during the Eocene

period. In strata of the next following (Oligocene) period certain stones, or eoliths, have been found, which seem, according to some specialists, to have been rudely chipped by the hands of an intelligent creature. Similar eoliths occur in the Miocene period, which has been reckoned at 1,800,000 years, and also in the Pliocene, which lasted 900,000 years. Towards the close of this age the evidence becomes more definite, and, according to some of the best of our authorities, man, or a creature closely resembling him in physical characters, lived all through the last, or Pleistocene, period—that is, through all the four Ice Ages. These, according to James Geikie, occupied from 500,000 to 1,000,000 years.

Even the very lowest of all these estimates represents a lapse of time which no human brain can quite comprehend. If we allow twenty-five years to a generation, then, taking the lowest estimate, father and son followed each other for some 50,000 generations before the very beginning of the recent period. But only some thirty-six generations ago some of our ancestors were savage Northmen and Vikings, who enjoyed tossing babies on their pikes, and were in body, mind, and sentiments decidedly different from ourselves. But it is hardly necessary to go farther back for a beginning than the Eocene and Oligocene, which probably ended, as we have seen, at least 3,200,000 years ago.

During the Eocene period a great ocean extended from the Spanish Pyrenees to Japan. Northward it covered the whole of that part of Europe where long afterwards the Alps were to appear, and to the south it passed far beyond the limits of the Mediterranean, covering most of Egypt, most of Arabia and Persia, as well as the site of the future Himalayas, and so eastward to China and Japan. The existence of this Nummulitic sea is of great importance to the theory of human origins. It was surely a genial warm-water ocean extending upward into the heart of Europe, and with numerous bays and indentations

of the coast-line. It is, at any rate, clear that warm water from the tropics must have had a fairly free course all the way from Yokohama to London.

In North America the sea in Eocene time overlapped part of the United States coast-line from New Jersey southwards and round the Gulf of Mexico. It seems to have submerged Central America and to have also covered part (the coast ranges) of California and Oregon. The conditions were therefore apparently similar to those in Eocene Europe; the coastal climate would be on the whole warm and genial. Along the shore of this ocean both in Europe and America were many wide bays and river estuaries. The most famous, perhaps, are an arm of the sea that extended up the Mississippi to the Ohio mouth, and another which covered the site of London, and in which the London Clay was deposited. (This was 500 feet deep in Southern Essex). There was also another in France which ran up from the Loire mouth across Vendée and into Brittany.

But here and there along this Eocene shore-line there may have been locally colder conditions.

The mountains (which are now hills) of Scotland and Wales, or of the Archæan districts of Bohemia, may have been covered with district ice-sheets, and glaciers may have flowed from them. Thus erratic blocks in strata of Eocene age near Vienna seem to have been carried by ice from the then extant mountains of Bohemia. But with the free ingress of currents of warm water from the tropical ocean all the way from San Francisco to New Jersey and from Bournemouth to Japan, the climate must have been at least warm, temperate, and comfortable.

The Eocene flora seems certainly to be one which is most likely to have flourished in a genial if not quite tropical climate. It included Palms, some of them of large size, Ficus (Figs), Breadfruit, Magnolia, Eucalyptus, Almonds, Eugenia, Laurel (Laurus), Cinnamomum, Musa, Walnut, Sassafras, Liquidambar and Grevillea. These

might, all of them, have lived comfortably in a climate like that of modern Greece or the Canary Islands. Others such as Sequoia, Thuja, and especially Oak, Hazel, Alder, Poplar, Willow, Hawthorn, Prunes, Hedera (Ivy), seem to be temperate plants, such in fact as one would expect to find in the lowlands of Scotland or in the Eastern United States. Some authorities have suggested that in those early days plants had not yet adapted themselves to all the variations in climate and habitat which exist to-day. There is probably some truth in this; but if one tries to realize the probable conditions along the shore-line of the Eocene sea, there is very little inexplicable in the fact that such plants as alder and breadfruit, figs and oaks, were deposited in the same estuary.

Owing to the peculiar distribution of land and water and the probable course of oceanic currents, there would be, along the whole line from San Francisco, Gulf of Mexico, New Jersey, Bournemouth, London, France, and Spain, very similar climatic conditions. In favoured spots the warm flora would extend far farther to the north than it ought naturally to do, and in these places especially, any river coming from the higher ground might quite well have brought with it leaves from the oak or even pine-woods, as well as willows, poplars, alders, and hazel-nuts from upland valleys. One curious point has been made by several observers who have specially studied this evidence. Though there were grasses, sedges, and herbaceous plants, these were but poorly represented.

The trees and shrubs were probably scattered with a calcareous soil visible between the scanty and distant tufts of small wiry shrubs or perhaps Carex. Arundo and Phragmites may have fringed the lakes and Cyperus occupied the marshes much as they grow to-day.

But it was not an age of grass-lands, nor, so far as one can judge from the confusedly mixed elements of the flora, an age when there were dense tropical forests or great woods of pure oak or pine.

If these conditions are at all near the truth, insects, millipedes, lizards, and snakes were extremely abundant. Many of the mammals seem to have been insectivorous, and the ancestor of the modern hedgehog, pig, tapir, and deer have been more or less doubtfully recognized. But along with these more or less modern types there were survivals of older days, for the most part uncouth and strange-looking creatures, often huge in body but very weak in brain. For the story of man the important point is that remains of lemurs have been found in the *Lower Eocene* (Puerco beds) of North America. They are followed by monkeys as well as tapirs (Middle Eocene), and insectivorous animals in the Upper Eocene (see p. 85). So one naturally wonders if a sort of generalized lemur-monkey-man could have lived on the Eocene coast-line. We have seen from two sets of evidence, which are quite independent of one another (the set of the ocean currents and the character of the plants), that the climate was apparently warm and genial, but not oppressively hot.

Such a creature could surely live fairly well along the seashore. There seems to have been an abundance of oysters (Thanet, Woolwich, Bagshot, Bracklesham and Barton beds, Calcaire Grossier of France and also Belgium), as well as of other shellfish. He could, even without special weapons, grapple with turtles and tortoises. Insect life, judging from the special insect-eating animals and probable climate, seems to have been abundant. On the bushes by the rivers and along the shore there were all sorts of fruits and nuts. For the subsistence of our lemur-monkey-man in the early stages of evolution, what fruits would seem *a priori* most suitable?

I think that one would select the banana and bread-fruit. Ancestral forms of both were flourishing in the Eocene. Many other fruits with which man has been afterwards continually (perhaps one might venture to say *most intimately*) associated occur at this period. These

are, most of them, found in so many places that one is apt to think they were then of world-wide distribution.

In the temperate brushwood and on river-sides, acorns, hazel-nut, hawthorn, sloe, cherry, and plum might be found. Here and there he might alight upon a walnut or almond; figs also of one kind or another seem to have been common. Palm-trees existed, and some of them were of enormous size.

If the idea of climatic and other conditions which we have tried to express is at all correct, there ought to have been many bulbs; but these would seldom be preserved as fossils, for they would grow in drier land away from the river-bank.[2] Birds, who had not yet learnt any special fear of mankind, would nest in the bushes and roost in the branches. There is nothing to show whether the honey-ant, termites, and the honey-bee existed in the Eocene. With honey, in addition to the other items given above, the lemur-monkey-man could have found every article of diet which is of importance to the lowest races of mankind. A Yahgan, Bushman, or Vedda, would consider a land like this a paradise. Moreover, there was not, so far as we are aware, any carnivorous creature in the Eocene period, or one which might have been a serious enemy. If a Deinoceras or other formidable beast quarrelled with him, he would surely have sufficient agility and intelligence to climb a tree and so escape its attentions.

One curious point which is worth noting in connection with the origin of mankind is that such a creature, though not likely to have existed in large numbers in any district, could have wandered all over the northern hemisphere from San Francisco to New Jersey, and from Bournemouth to Japan. The plants with which he was associated contain ancestors of the Australian, West Indian, South African and Palæarctic floras of to-day. But there is so little evidence regarding the southern shores of the Eocene sea (or nummulitic ocean), that we cannot say if he could cross the Equator or not.

During the next two geological periods (Oligocene and Miocene) all the grandest mountain-ranges of our modern world made their appearance. Not only the Himalayas, but the Rockies and the Andes as well as the Alps seem to have first appeared in the Miocene. As we should expect, these were, especially in Europe, associated with corresponding depressions—that is, great valleys or troughs. Some of these latter were broad estuaries, or varied during this period, being sometimes arms of the sea, then swamps of brackish water or wide fresh-water lakes. Perhaps there were minor readjustments and up-and-down movements of the earth's crust before it settled down to geological ages of rest in a new position. Later on, towards the close of the Miocene, a further sinking of the earth's crust allowed the waters of the Mediterranean to pass up into the heart of Switzerland and into the great stretch of lowland in Austria, from Vienna to the Carpathians.

Subsequently the bottom of the great Swiss lake was again thrust upwards, and part of it now forms the summit of the Rigi. It is impossible for us to attempt even to sketch the history of Europe in the Oligocene and Miocene. But we should point out that, as we should expect, this period of dislocation and disturbance was accompanied by volcanic outbursts. Along the lines of weakness or of stress, volcanoes appeared with earthquakes and enormous floods of lava. Indeed, the Western Highlands and Islands of Scotland, and Auvergne, in Central France, must have then resembled the neighbourhood of Naples, Valparaiso, or Japan in the present day.

These changes in the surface of Europe and Asia must have altered the conditions of life for our Miocene ancestors. Thus it seems likely that Europe, Asia north and south of the Himalayas, and perhaps Europe north and south of the Pyrenees were all separated from one another by mountains or water-barriers, which would be insuperable to the lemur-monkey-man. He would probably avoid

those special districts which were overflown by lava or covered by volcanic ashes, as M. Rutot has pointed out. That he would fly the whole country in terror and amazement seems unlikely. Neither wild animals nor man have abandoned Chile or Japan in consequence of occasional earthquakes and eruptions.

But there were also changes in the flora and fauna of Europe which must have altered his way of living altogether. The climate was no longer, all over, moderately warm and genial. In certain places it seems to have been decidedly tropical, and in others, in consequence of the new high land and mountains, temperate or even cold temperate. Yet it seems that a sort of South Sea Island or Bahama climate persisted in some districts, for there were corals in England, France, Belgium, and Germany during the Oligocene. Both in Greenland and in Alaska the climate was extraordinarily warm and genial. A rich and luxuriant forest of Walnuts, Oak, and Poplars (at 70° N. Lat.) as well as Magnolia, Plane, Lime, and Beech were growing in Miocene Greenland, and farther north, within 500 miles of the North Pole, Pine, Spruce, Cypress, Poplar, Hazel, and Birch, even Elms, Viburnum, and the Water-lily managed to maintain themselves.

It is probable that these trees would not always form a close wood, but grow in a scattered, park-like way. Yet in the Miocene period and perhaps in the Oligocene there seems to have been real forests and close woods, especially in the estuary of Bovey Tracey (Devonshire), and on the shores of the great lakes of Switzerland, France, and Austria. Thus in the Oligocene, Eucalyptus and Proteaceæ grew in Devonshire. In the Miocene, Acacias and the Sabal Palm flourished at Mainz and in Switzerland.[3]

But of still more importance is the fact that in the Miocene period grasses had begun to clothe the earth's surface with a continuous green carpet. Until then the evolution of the animal world had been limited to a very

few of the mammalian orders, but now all sorts of ruminants began to appear. It was in this age that the true grinding molar, adapted to chewing grass, developed from the three-tipped, or trituberculate, type, which characterized the previous era.

In America there were already living many animals resembling modern forms, such as the opossum, marten, civet-cat, shrew, mole, musk-rat, as well as the tapir and rhinoceros. But in the American Miocene new forms of life appeared, including swine, camels, llamas, and deer. The mastodon and rhinoceros ranged from France and Switzerland to the Siwalik Hills of India, and the French rivers contained hippopotami. All over the world, in the low-lying swampy marshes and wet beech-forests of Patagonia, in the classical collecting-ground of Uinta, John Day and Loup Fork (North America), in France, in Switzerland, and in British India, new creatures, often strange and extravagant in appearance, but more usually pioneer genera of our modern world, seem to have flourished abundantly. For our Miocene ancestors, however, the situation had utterly changed. Amongst these new genera were carnivorous animals, specialized for preying upon the weaker and less well-armed ruminants, and developing for this aim not only their eyesight, scent, and cleverness, but also a swiftness in running and agility with which he could not hope to compete.

There were dogs or wolves, and cats (White River, Mid-Miocene America), as well as hyenas (Deep River, Upper Miocene). The sabre-tooth tiger (*Machairodus cultridens*) wandered through France with many other dangerous animals. We left our Eocene lemur-monkey-man living partly on shellfish by the shore, partly on fruits, nuts, turtles, insects, birds'-eggs, and other miscellaneous trifles. What was he to do? How did he manage to survive the Miocene period? There is just a strong probability that his descendants specialized. At any rate, true lemurs

have been found in the Fayum of Egypt (Oligocene). Monkeys seem to have lived even in the Eocene (middle series of America), but in the European Miocene there were not only monkeys of the ordinary type—Cebidæ, Cercopitecoideæ, and Simiidæ—but others which resembled the Gibbon (in teeth and in the jaw), and which may be called "anthropoid."

That may mean that the descendants of the common Eocene ancestor had adopted four distinct and different modes of life. One group remained nocturnal, fruit and insect eaters, living in trees, and these are now represented by the lemurs; others, now monkeys, went about in troops, feeding by day on nuts, fruits, and birds'-eggs; a third group had specialized on the lines which led to the modern gibbon, orang, gorilla, and chimpanzee—that is, they were animals of the tropical jungle with powerful jaws and muscles, as well as with sufficient strength and ferocity to keep at bay any ordinary enemy, and these also lived in trees. Was there a fourth group which contained our special ancestor? If so, it seems likely that he also lived more or less in the branches, for, as we shall see in another chapter, there is some anatomical evidence which points to this conclusion. If he used eoliths, then it is clear that he must have hunted in the daytime, and was not nocturnal. That also seems *a priori* to be probable, for most of the carnivora hunt by night. It seems likely that he frequented those woods which were near the sea-shores or on the margin of the large lakes. Suitable stones for eoliths are not easily obtained in dense forest, and when found would not be, in the forest, of very great advantage to him. On the other hand, if he continued to live on oysters and shellfish, eoliths would be invaluable. He could use them to deal efficiently and especially quickly with crabs, sea-urchins, and all sorts of shells. Probably he was always and for ever looking over his shoulder and in fear of his enemies, and the power of

rapidly collecting and breaking open shellfish would be of the very greatest advantage to him. We cannot, of course, prove that he frequented the sea-coast and lake margins. But it is worth noting that many of the lowest savages do, or did so (*e.g.*, Yahgans, Tasmanians, and the "Kitchen-midden" folk of Europe and elsewhere). Monkeys also come down to the mangrove creeks of West Africa (Sierra Leone) in order to feed on oysters, as I have myself seen. Perhaps, like the orang-utan of to-day, he slept in the branches and constructed a rude sort of nest by intertwining branches and twigs. He would feed on very much the same materials as his Eocene predecessor; he could have found turtles or tortoises in the European Miocene, and perhaps watched the female crocodile laying her eggs on sandbanks in or near the Solent. The eoliths frequently mentioned in this chapter are flints of various ages which have certainly been struck or chipped in an unusual way. But the violent controversy as to whether they were or were not the first attempts of man the artifex is still unsettled. These eoliths occur at many isolated localities as far back as the Oligocene, but are nowhere abundant.[4] The best known are those of the Middle Oligocene at Boncelles discovered by De Munck and Rutot; of Thénay (Upper Oligocene) by the Abbé Bourgeois; of Duam and Puy Courny, France (Miocene) discovered by M. Rames in 1877; of Otta Téjotal, Portugal (Miocene) by M. Carlos Ribeiro; at Foxhall, Ipswich below the Red Crag (Early Pliocene) by Mr. Reid Moir; of the Kent Plateau (Mid-Pliocene) on the North Downs, found by Harrison in 1865 and belonging to a period in which what is now the Weald was a considerable hill that has since been entirely removed by denudation. They have been discovered also in the Cromer Forest bed by Lewis Abbott; in the Norwich Crag (by Dr. Clarke), at Salisbury by Dr. Blackmore, and at St. Prest, in France. All these last belong to the Upper Pliocene, in

which it seems very probable that man inhabited Europe. They have also been found in Burmah, in South Africa, in Egypt, and elsewhere. They were *not* found at Dawlish.

It is not disputed that most of these eoliths do fit themselves conveniently to the hand, nor that man could have produced the marks which they show. Indeed, Mr. Reid Moir and M. Rutot have actually made eoliths closely resembling actual specimens. Nor is there any dispute as to their being of real benefit to our ancestor if they were really made by him.

Suppose that *Homosimius precursor*, which is the correct name for Oligocene man, had ventured on to the rocks at low tide and is busy with his eoliths, crouching on all fours. He catches sight of some dangerous beast about to attack him. Homosimius at once stands up as well as he could (which in itself would alarm the animal) and throws two or three stones at it. This would at least for a moment or two check and puzzle his adversary. M. Rutot points out that the germ of the scraper, coup de poing, burin, and other flint weapons of later date can be detected in collections of eoliths, and according to M. Seyffert some of them could be used as knives. Living races such as the Seri Indians and the extinct Tasmanians did, as a matter of fact, use just such rudely chipped stones. But M. Rutot thinks that the eolith-maker was either not able to foresee the tool he required or at any rate could not get it with certainty.

There is no doubt that Chellean man in the next geological period did habitually manufacture flint weapons, and both knew and succeeded in getting what he wanted. Could he suddenly develop this art? One would think that the interval between the first more or less intelligent animal that used a stone to smash a shell and the man of Chelles must have been an excessively long one.

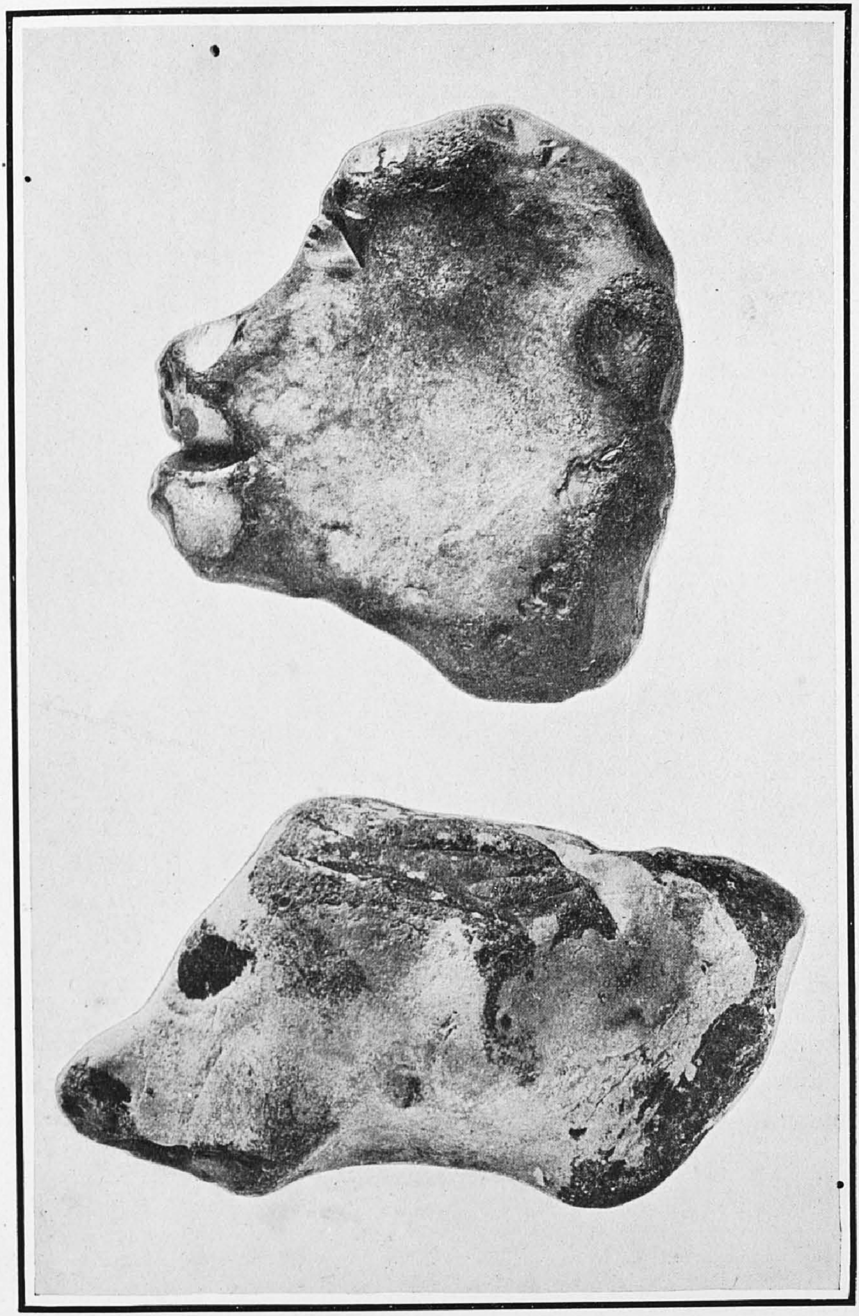
Moreover, the way in which eoliths occur at distant intervals and in different places is just such as one would

expect if the precursor was rare and few in numbers, but still did manage to survive all through Miocene times. The arguments against the human origin of eoliths are that these flints could have been chipped by other than human hands. Thus it has been suggested that torrents or waterfalls might produce similar chipping; cartwheels on a road repaired with flints sometimes cause eolith-like markings; a certain cement mill near Mantes turned out many flints with chipped surfaces, which could be compared with eolithic flints. The most recent explanation is that flint nodules crowded together may be squeezed forcibly against one another and become flaked during movements of the strata while settling under pressure. The Abbé Breuil found, in fact, certain flints in Lower Eocene deposits which were flaked by this means.[5]

Mr. Reid Moir[6] tried to break flints by pressure according to the manner suggested by M. l'Abbé Breuil; when the flints were placed in an iron dish and covered by one to one and a half inches of sand, he found it quite impossible to break them in this way. He also tried to produce eoliths by violent shaking of flints in a sack, but found the resulting fractured specimens to differ from eoliths. The flakes were chipped off at different angles, and did not show any succession of blows at the same angle and of a clearly intentional character.

To the superior Oligocene also belong the eoliths found at Boncelles by M. Rutot. These particular specimens were discovered in strata containing shells characteristic of that period.[7] According to M. Rutot, they could be used as hammers, anvils, knives, razors, scrapers, awls, or throwing-stones. They do, undoubtedly, resemble similar specimens which were used by the Tasmanians, who became extinct in recent times, and who were not at all expert in the manufacture of stone implements.

Amongst those who hold that eoliths are the work of man or some *Homosimius precursor* are M. Rutot,



THE FIRST ATTEMPTS AT SCULPTURE

Stones slightly altered by primitive man so as to look like a bird or animal
The specimens were discovered by M. Dharvent and are from photographs by him

Reed Moir, Ray Lankester, Klaatsch, and Noetling. Most of these authorities are more or less specialists in archæology, and most of them have tried by actual experiment to produce them. Amongst those who deny the human origin of eoliths, are Sollas, Boule, Commont, Breuil, and, perhaps, the majority of anthropologists. Yet, if we suppose, as a working hypothesis, that our Oligocene and Miocene ancestors did actually chip and use these stones, one may perhaps say that the rudeness of the workmanship, the manner in which they occur, and, indeed, all the circumstances are exactly what we should have expected. Moreover, there were neither cartwheels nor cement mills in the Miocene.

Surely, also, if there is little to prove that eoliths were made by man, there is even less to convince us that they were formed in any other way.

We should warn the reader that eoliths are out of fashion at present in anthropological circles. Personally we find it more difficult to believe in the natural agencies supposed to have made them than it is to believe in a forerunner of mankind, not man, but yet an intelligent creature. But we must leave our very hypothetical forerunner in a humid, semitropical Miocene climate. He comes out in the morning to gather fruits, nuts, birds'-eggs, insects, and small mammals; he also breaks his nuts and smashes his shellfish with stones *or eoliths;* and he retires at night to the branches, where he sleeps on a rudely entangled mass of twigs, not in the least realizing what is to be his future destiny.

[1] The lowest period is that given by Lord Kelvin—viz., 20,000,000 to 40,000,000. The estimates of George Darwin, 56,000,000, of Sollas, 60,000,000 to 80,000,000, of Joly, 90,000,000 to 100,000,000 years are all much lower than those based on the behaviour of radio-active minerals which seem to require an antiquity of 370,000,000 years. A full discussion is given in an interesting book by Holmes (*Age of the Earth.* London, 1913).

[2] Agave occurs in the London Clay.

[3] The occurrence of a few of the leading plants (shown by asterisks) is indicated in the following table:

	Chalk Period.		Eocene.	Oligocene.					Miocene.
	Greenland.	Europe.	North America.	Bovey Tracy.	Swiss Molasse.	Central France.	Mull, Skye.	Germany.	
Oak	*	*	*	*		*	*	*	*
Hazel			*				*		*
Alder			*		*		*	*	
Poplar			*				*		*
Willow				*			*		
Magnolia ..	*	*	*				*	*	*
Juglans (walnut)	*	*					*	*	*
Cinnamomum ..				*	*	*		*	*
Palms			*		*			*	*
Fig	*	*		*	*			*	*
Vine				*					*
Laurel	*	*		*	*	*		*	*
Evergreen oak ..				*	*				*
Acer							*		*

[4] The recent work of Professor Sollas contains full details of these localities and of the general argument. As we try to show later on, the Kent Plateau and Cromer Forest bed were quite probably inhabited by a more or less human precursor.

[5] Breuil, *L'Anthropologie*, 1910.

[6] Reed Moir, *Nature*, 1912.

[7] *Cytherea Beyrichii*, and a sea-urchin, *Spatangus Desmaresti*. See Rutot, Bull. Soc. Belge Geol., 1907.

CHAPTER II

MISSING LINKS

In the last chapter we tried to show that if a small and feeble lemur-monkey-man existed in the Eocene,[1] every condition would have favoured him. He would have enjoyed a climate moderately warm, and food would be plentiful; he would have had but few dangerous animals to fear; and might have wandered over the whole width of the world, at least in the Northern Hemisphere. But even in the Miocene great changes had been begun, and for the Miocene anthropoid, *Homosimius precursor*, if he lived on into the Pliocene, life would become a strenuous and difficult business. The changes in the surface of the land are in the highest degree difficult to follow. The Alps, Rockies, Andes, and Himalayas were already beginning in the previous Miocene; but the upheavals and depressions of Pliocene Age are even more confusing and extremely difficult to explain. We find that the present German Ocean was sometimes dry land, then an estuary, then a wide valley, and then it was again submerged below the sea. Perhaps the reader will excuse a very simple comparison, for we do not wish to enter into any details which might confuse the consecutive story of human origins.

At times the surface of the ocean is smooth, hardly showing the tiniest of ripples. When a storm is working up, the water is thrown into undulations or waves, which gradually rise in height. As soon as the waves run "mountains high," their tops are broken in spray, and the distance from the crest of one wave to that of another

shortens. As the storm gradually passes away, the waves still follow one another, but gradually become lower and with summits farther apart. Afterwards, perhaps, there is only a slight gentle swell or rolling undulations far distant, and slowly following one another; finally all motion seems to cease, and the surface is again smooth and placid, with but the faintest sign of the storm that has passed over it. Now, the crust of the earth passes through very similar changes. The earth's surface, which seems to us *terra firma*, solid and immovable, is really but a crust or skin which is always, more or less, being thrown into the slightest or gentlest of undulations. From the Eocene onwards, these undulations were increasing in amount; so certain points on the earth's surface would rise and fall, just as, on the sea, a jelly-fish would rise and fall as the wave passed it.

In the Miocene, higher mountains and deeper valleys were produced, but in the Pliocene the process reached its final culmination. The end of this period is marked at first by deep depression of the land or transgression of the sea. The Atlantic entered the English Channel and German Ocean. The Mediterranean penetrated up the Rhone into the heart of France, overflowed both flanks of the Apennines; a deep sea fjord occupied the valley of the Po; another branch of the Mediterranean submerged the low land about Vienna and extended up to and on both sides of the Carpathian Mountains. Then followed a period of elevation, during which the land rose again. Part of the English Channel and German Ocean became dry land; the sea gradually abandoned France and Austria and retreated down the slopes of the Apennines; the valleys of the Rhone and Po were raised (1,200 to 1,500 feet). This was the last stage of the Pliocene. As we shall see later (p. 120), the Ice Ages passed away in a quite similar series of sinkings and risings of the land. The reader must please excuse an illustration so simple, and which, it must be confessed, is not altogether a satisfactory one

These changes were of very great importance for the history of mankind.

At one period there was, according to Hull,[2] a general uplift of the whole Atlantic coast-line from the Arctic Ocean to the mouth of the Congo, and as far south as 6° S. Lat. The whole of the shore-line rose 6,000 to 7,000 feet. A river wound in a serpentine way down the valley, which is now the Irish Channel, and entered the ocean after a course of 250 miles over the Continental platform. The Seine joined another great river in the English Channel, of which the Hurd deep is part, and the latter entered the ocean through lofty walls of rock. The mouth of the Adour was then 100 miles from the present coast-line, and is at a depth to-day of 1,200 fathoms. The former delta of the Tagus has been traced, and also the old valley of the Congo, which lies 122 miles out at sea, and at a depth of 1,200 fathoms. On the American side, a former gorge of the Hudson River, 300 feet deep, has been discovered near New York; it seems that the stream once meandered through a rocky defile, which is in places 4,000 feet below the present sea-level. The whole Mediterranean basin was raised 1,200 to 1,500 feet.[3] Late Tertiary, and even Pliocene, are rather indefinite terms; but if this enormous earth movement began in America and continued eastward all round the Atlantic, then it would follow that the descendants of the rich flora and fauna of Miocene America could travel all the way into Europe via Greenland.

Moreover, both plants and animals might have enjoyed during the whole of their migration that warm, comfortable climate which marked the Miocene of America. For under the conditions supposed, cold water and icebergs of the North would be necessarily shut out of the Atlantic altogether. But when the "ancestors" had arrived in Europe, and the Pliocene earth movements had finished, all the conditions of life for the earliest precursors were altered. We still find the same warm climate in Southern Europe, in the valley of the Arno, at Pikermi

in Greece, as well as, no doubt, far to the east and south, as in the Siwalik Hills of India and in Java; but it was not now general, at least in some places where Pliocene deposits have been studied. In the Upper Pliocene Europe was roughly blocked out with its Alps, Jura, Pyrenees, and Carpathians. It had still to be chiselled and planed by ice; its surface was to be smoothed and plastered over by sheets of boulder-clay, etched in detail by a multitude of river systems, and all its outlines were to be softened by some 50,000 years of vegetation; yet Europe, as we know it, existed, and this involved two important consequences. First, henceforward the "ancestor," if in France, was cut off from his distant cousins by barriers of cold country, by mountains and water which he could hardly traverse. Secondly, he, in common with other animal ancestors, had to endure a climate changing steadily for the worse.

There is a theory that many forms of plants and animals originated in the Arctic regions of the Old World. This, however, seems unlikely; either during their passage all the way round from America to Central Europe, or even after their arrival in Europe, they may have been exposed to half Arctic conditions, which brought about modification. It is surely only in this sense that the Arctic regions can have been responsible for the production of new species of animals or plants. But if the human ancestor did arrive by this route, there ought to be some definite proof of his existence in Pliocene Europe. Such proof exists, for there is no doubt that in the forests of Southern Europe, and in the Siwalik Hills in India, Pliocene anthropoids were, if not exactly common objects of the countryside, by no means rare. In Java, also, the famous *Pithecanthropus erectus*—a "missing link,"—lived in Pliocene or Early Pleistocene times.

In England, eoliths have been found below the Red Crag, and in the Cromer Forest bed. It is quite possible that the Piltdown (Sussex) skull and the Heidelberg jaw

belong to this same period (which is described sometimes as Pliocene, and sometimes as Pleistocene).

But there is a certain want of definiteness in the words Pliocene and Pleistocene, which we personally think is responsible for most of the misunderstandings and differences in opinion regarding man's first appearance in the world. We have attempted to follow the magnificently simple classification of Penck and Bruckner in this book, and believe that this is not only the nearest to the truth, but by far the most intelligible and simplest arrangement yet produced. We begin the next period in man's history with the First Age of Ice, represented in England by the Arctic shells of the Chillesford beds in Norfolk. It seems certain that anthropoid apes, as already mentioned, lived in Auvergne, Greece, Italy, and India, before this time; but it is probable that before this First Ice Age (the Gunz) they had been exterminated in Europe, or had travelled eastward into Asia.

The sea along which the earlier user of eoliths wandered was a warm-water ocean, with many shells of distinctly southern character, such as are now to be found off Portugal; but all through the beds known as the Red Crag, Norwich Crag, and Chillesford—that is, during the advance of the Gunz Ice Age—there is evidence that the climate was changing for the worse. The southern shells gradually disappear, and northern species take their place. Indeed, in the Chillesford deposits, Arctic shells are found, which show that cold water from the North had managed to reach this neighbourhood.

This First, or Gunz, Ice Age passed away; the climate became mild, genial, and comfortable, and the German Ocean near Cromer vanished, leaving a broad valley of marshy alluvium. The remains of the plants and animals of this great valley constitute the fossils of the famous "Cromer Forest bed," which belongs, according to this classification, to the First, or Gunz-Mindel, Inter-glacial.

When this, the first of the Ice Ages, passed away, the

surface of the land rose, forming a broad alluvial valley, which seems to have stretched right across from England to France, and through which a great river meandered. This period of land elevation would correspond to the great drawing back of the sea in France and Italy (see p. 34). Thanks to Clement Reid, Boyd Dawkins, and others, we know very well indeed both the plant and animal life of the Cromer Forest bed.

When one remembers that this forest flora was growing about half a million years ago, and that Europe since then has passed through the strangest vicissitudes of climate, it is astonishing to find that there is absolutely nothing in the least remarkable about it. The same species that we find to-day seem to have grown, and in the same associations. The waters of the pools and backwaters contained water crowfoot, white and yellow water-lily, and nine species of Potamogeton. The reed-beds were formed of *Scirpus lacustris* and phragmites, with, in places, water plantain and bur-reed. In the marshy ground our Pliocene ancestor might have found spearwort (*Ranunculus flammula, R. lingua*), marsh marigold, marsh violet, œnanthe, cicuta, *Carduus palustris*, bogbean, and *Polygonum amphibium*. In the woods on higher grounds were oak, beech, hornbeam, wych elm, English maple, and birch. Brakes of hazel, alder, and willows accompanied the rivers, and in the brushwood of the slopes and open places buckthorn, dogwood, guelder rose, hawthorn, sloe, brambles, and rasps, were flourishing.

On slightly higher land, Scots pine and spruce formed woods through which tributaries flowed to the main river. On bare places along the river banks and on shingles, common weeds such as nettle, dock, chickweed, coltsfoot, chenopodiums, and polygonums were biding their time until there were gardens and arable land. There are in Mr. Reid's lists a few plants which seem to imply rather a warmer climate than now prevails at Cromer,[4] but the

vast majority grow almost everywhere in England and Southern and Western Scotland. The flora is a modern European temperate flora without even the magnolias, pterocaryas, vines, and aquilegias found at Tegelen-sur-Meuse (near Venloo in Limburg), which seem to be of nearly contemporary age. The animals which fed and wandered through the valley, and which were occasionally bogged in the mud or drowned by floods, are of great interest. Some of them, such as the hippopotamus, rhinoceros, and hyæna, seem to be incompatible with brambles and marsh marigold. But as the reader will see on referring to the table (p. 131—those found in the Cromer Forest bed are placed in the third column), a few still live in England, such as the squirrel and mouse; others, such as the wolf, deer, wild boar, bear, and beaver, survived until historic times. Moreover, along with the hippopotamus and hyæna which one associates with the mouth of the Nile, one finds the musk ox, which belongs to the Canadian north-west and other cold, temperate, or half-Arctic climates.

On the whole, it seems probable that Cromer was near the great river, and that the more southerly animals may have ranged all the way south to Portugal and North Africa, along a seashore which is now submerged, but which may have had a Devonshire climate. The musk ox may have reached Yorkshire or France during the previous cold Chillesford or Gunz Ice Age, and have lived on in the pine forests of the highlands (see p. 25) of Britain, or in France.

A Pliocene family are supposed, by some authorities, to have lived near Castenedola, in Italy. During the later part of this age this place seems to have been a shallow tranquil lagoon in which there flourished an extraordinary abundance of oysters and corals. One or more small rivers kept the water more or less fresh. As was usual in Pliocene times, these streams, when swollen with the melted snow, came down in torrential floods, carrying

with them large boulders as well as quantities of shingle, gravel, and mud.

The Castenedola man with his wife and child went out one day to gather oysters. They were hard at work collecting them in the shallow warm water, when they were all three suddenly surprised, overwhelmed, and drowned by an unexpected spate or flood of the river. Their bodies were crushed and broken, even the bones being separated; those of the man and child were scattered and dispersed (" Erano dispersi in un' area non molto grande ma dispersi e disseminati quasi sullo stesso piano "). The face and forepart of the skull of the woman were battered or driven into the hinder part of the skull, and the pieces of bone had to be carefully and patiently picked out from the greenish clay in which they were embedded. By further floods the remains were completely covered up until discovered by Ragazzoni in 1889. He telegraphed to Professor Sergi, who at once examined the place. It is, in fact, from Professors Sergi and Issel that the above details are taken.[5]

Now, if there had been any primitive characters in the bones, the discovery would no doubt have been accepted as a proof of the existence of Pliocene man. But the man was 1·610 metres and the woman 1·560 metres in height—that is, they were much about the modern stature. The skull of the latter is quite well formed, ellipsoid, wedge-shaped (in view from above), with an index of 71·42. The chin is particularly prominent, being well formed and stubborn-looking, and the teeth are small and not in any way remarkable. Hitherto, most anthropologists have refused to accept such modern-looking personages as belonging to the Pliocene. It has been suggested that they belong to the Early Post-Glacial Age, and were buried in this ravine.[6] The condition of the bones, as Sergi points out, does not suit this explanation. But the writer has not found any careful and accurate description of the position of the fossils when first found. Did they

occur exposed on the seashore, or in a ravine, or in a cavern? In any one of these three cases the bones are by no means necessarily of Pliocene Age.[7] At present, then, it does not seem safe to accept the Castenedola family as the first known Pliocene forerunners of mankind. Words very much the same must, unfortunately, be used of the South American fossils described by the celebrated Argentine savant, Dr. Ameghino. When the docks at Buenos Ayres were being excavated, the fragment of a skull was discovered. It was apparently found by workmen, and though strata in which it lay are of Pliocene Age, it is not clear that the skull itself is necessarily of that age.[8] As reconstructed by Dr. Ameghino, the skull has an appearance which is horribly Pliocene.

According, however, to other authorities, the poise of the skull is quite incorrect; if put at a proper angle, there is nothing in the least remarkable about it. This case, therefore, is one which cannot be accepted.

Another fossil, named by Dr. Ameghino, *Tetraprothomo* (that is the fourth ancestor before man) *argentinus*, was discovered at Monte Hermoso, in the Argentine Republic, in strata which are said to be of Lower Pliocene Age (Inferior Pampean). Unfortunately they consist of only two bones—a femur and an atlas (neck vertebra). Dr. Ameghino believes that they belong to a dwarf anthropoid about 3 feet high, which was, however, able to walk in a more or less human fashion. Others consider that the femur is not that of any anthropoid ape, but belonged to some extinct kind of cat.[9] As to the other bone, a single atlas, perhaps the author may be excused for remarking that a single atlas cannot possibly support the whole weight of the argument.

Man may have lived in Pliocene South America, but the proofs of his having been there at so early a time are not satisfactory. There is, however, little doubt that a man-like ape, or ape-like man, or some-

thing betwixt and between, did live in Java during the Pliocene period. Dr. Dubois discovered the remains of this creature in 1894, and ever since there has been a violent and voluminous controversy about its bones.

We shall not devote much space to *Pithecanthropus erectus*, for there are excellent recent accounts in such works as those of Dr. Munro, Professor Sollas, and Dr. Dubois himself.[10] The remains consist of a skull, a thigh-bone, two molars and one premolar tooth. They were found, *in situ*, by Dr. Dubois himself, near Trinil, and buried below some 12 to 15 metres of hardened sand, deposited by the River Bengawan. It is quite likely that the animal perished during a volcanic eruption. That the bones belong to the Pliocene Age seems fairly well proved, although doubts have been expressed on this, as well as on every other, point connected with Pithecanthropus.[11] The other fossils which were apparently its contemporaries include such characteristic Pliocene forms as Elephant, Stegodon, Rhinoceros, Hippopotamus (of Indian affinity), Hyæna, Tapir, Deer, Bubalus (identical with a Siwalik Pliocene form); and also a Lion, or something between a Lion and a Tiger. Most of these are allied to Nerbudda Pleistocene or Pliocene forms.

If the reader will compare the table on p. 131 he will notice that this is a very Pliocene association, and it looks as if Pithecanthropus had lived under much the same conditions as prevailed in India, Italy, Greece, and Southern France at that time. The first admitted point is that the femur is very human; Pithecanthropus must have been able to walk quite comfortably. The teeth are very large, much worn, and have spreading roots, and in this last respect resemble those of an ape. The transverse diameter of the second left upper molar of Pithecanthropus measures 14 millimetres. The table given below shows the measurements of the second molars in various other races of men and of apes.

TRANSVERSE DIAMETERS OF MOLAR TOOTH (SECOND MOLAR).

		Authority.
Piltdown, Sussex (lower) ...	10 mm.	Woodward
Spy I. (lower)	10 mm.	Woodward
Spy II. (lower)	12 mm.	Woodward
Pithecanthropus	14 mm.	Woodward
Australian native	15·5 mm.	Virchow
Five gorillas (average) ...	16 mm.	Duckworth
Six orang-utan (average) ...	15 mm.	Duckworth

The transverse diameter of the crown of the third upper molar of Pithecanthropus measured 15·3 millimetres, which is above the average of the six Orangs (14·1 millimetres), and of the Australian (15 millimetres), but less than that of the five Gorillas (16·25 millimetres). In fact, Pithecanthropus' teeth were smaller than those of most apes and of some very primitive human beings, but much larger than those of ordinary savages and civilized peoples. Indeed, in almost every measurement and character, the position of Pithecanthropus is almost ideally between the human being and the anthropoid ape.

It is not possible to explain the transitional or intermediate character of the skull without giving long series of anatomical descriptions and measurements, which would hardly interest the general reader.[12] But it is very difficult to see how one could possibly expect a missing link to fulfil all that is expected of such a being any better than Pithecanthropus certainly does.

The most ingenious and convincing way of showing that this is the case is to tabulate the opinions of those who have examined the skull. Amongst these are probably all the best living authorities on comparative anatomy of our own times—that is to say, all scientists whose opinion would be taken as final in any ordinary dispute. The skull is considered a human skull by six of these celebrated

authorities, who are for the most part English. It is thought to be a missing link that is intermediate by eight (mostly French); it is considered an ape's skull by six others, who are mostly German. Only one authority makes the femur that of an ape, thirteen consider it human, and six make it out intermediate. There is hardly a reason to doubt that the skull and thigh-bone belonged to the same animal, for they were found at the same level and only 15 metres apart. That the femur is more human than the skull is, as Dr. Munro has shown, a curious confirmation of what ought to happen on theoretical grounds. Man *theoretically* ought to have begun to walk uprightly *before* his brain developed to the average scale required in mankind.

Yet *Pithecanthropus erectus* seems to have possessed considerable intelligence.

It is supposed that the skull is that of a female. The capacity of her brain has been estimated at between 800 to 900 c.c. (The most recent calculation known to me is 855 c.c.) The largest ape brain seems to contain only 600 c.c. (after Duckworth), which is about 25 per cent. less. Nor is Pithecanthropus' brain so very small, either, when compared with certain human skulls. In the Tyrol one brain with a capacity of only 880 c.c. was discovered by Tappeiner. This, however, was the smallest in a large series ranging up to 1,900 c.c. But in Peru (Hrdlicka) twenty-one skulls of women were discovered ranging from 920 to 1050 c.c. The Piltdown (Sussex) and Gibraltar skulls contained as much as 1,070 and 1,080 c.c. respectively.

Moreover, Pithecanthropus' brain shows, according to Dubois, one point of special interest. That particular lobe which deals with the power of speech is well developed, being twice as large as the corresponding part in certain apes, though only about half the usual size of this lobe in man. One of the hardest problems in the story of the earliest ancestors is to understand how early man suc-

ceeded in surviving through a period when many ferocious carnivora undoubtedly existed. Suppose that Pithecanthropus was caught, when munching fruit, by the redoubtable *Felis Grœneveldtii*, the name (somehow appropriate enough) of the fearsome creature, half lion and half tiger, which was one of her contemporaries in Java.

She would at once draw herself up to her full height (about 1,700 millimetres). Her appearance would then be sufficiently alarming: the strongly marked eyebrow ridges, the powerful jaw, huge grinding teeth, retreating forehead, widening behind and covered with tangles of black or brown, woolly or wavy hair—all these would impress his mind. She would certainly exercise her power of speech, such as it was, in yells, howls, and resonant exclamations. Perhaps she was intelligent enough to throw stones, sticks, fruits, or whatever came to her hand, at the enemy.

These three things, all very unusual in the Pliocene world—energetic if inarticulate vituperation, an erect position, and action at a distance—would surely confuse and impress the primitive brain of *Felis Grœneveldtii*, and he would probably retire, with dignity, to seek some easier prey. Some authorities consider Pithecanthropus to be in the direct line of descent from the Simiidæ (generalized monkeys) through the Neanderthal type to recent and living man.[13] Others suppose that this species was a relation—a near cousin, let us say—of the particular Pliocene form from which man has descended,[14] and this seems the most satisfactory theory. There are certain characters in which the Australian aborigine is more ape-like than Pithecanthropus, such as the size of teeth, eye orbits (*cf.* Cunningham), and other characters. Nor does it seem to be proved that Pithecanthropus had over-specialized on lines which would prevent further development in the human direction, though this has been maintained by Kollmann.[15]

On the contrary, this increase in brain, which is clearly made out, proves that Pithecanthropus was developing on

the right lines. A tropical forest in Java is not, however, the place in which we would expect the original ancestor to be found (see p. 92). It seems most likely that Pithecanthropus was a Pliocene cousin not very far removed from the ancestor, but he or she is undoubtedly the most important missing link yet discovered.

The climate in which Pithecanthropus lived seems to have been colder, but probably more humid, than that of modern Java. The plants associated with the remains are all living, and resemble those of the present flora of Assam at 750 to 1,200 metres altitude.

[1] Eocene, Oligocene, Miocene, and Pliocene followed one another. The non-geological reader will observe that unfortunately e, o, m, p, are *not* quite in alphabetical order.

[2] Hull, *Suboceanic Physiography, North Atlantic.* London, 1912.

[3] *Ibid.*

[4] *Ranunculus nemorosus, Hypecoum procumbens, Trapa natans, Naias minor* (see Reid, *Origin of British Flora*).

[5] Sergi, *Rivista di Antropologia*, 1912, vol. xvii., fasc. 1-11.

[6] Penck and Bruckner (*Alpen im Eiszeitalter*), and Peet, consider that they must be from a burial.

[7] See Hrdlicka, on whose authority these objections are given.

[8] *Ibid.*

[9] It seems very unlikely that so distinguished a palæontologist as Dr. Ameghino could have made such a mistake. The general opinion of anthropologists seems to be against the existence of pliocene man in South America.

[10] Sollas, *Ancient Hunters*; Munro, *Palæolithic Man*; Dubois, Royal Dublin Society, 1895.

[11] Notably by Volz and other geologists; also Schuster, *L'Anthropologie*, 1911.

[12] *Cf.* Duckworth, *Morphol. and Anatomy.*

[13] See Schwalbe *v.* Sergi, *Rivista di Antropologia*, 1912, vol. xvii., fasc. 3.

[14] Wiedersheim, *Der Bau des Menschen* (Tubingen), 1908; also Schlosser (see Sergi, *loc. cit.*).

[15] Cunningham, *Journ. Roy. Anthrop. Inst.*, January to June, 1907; Kollmann, *Arch. f. Anthrop.*, 1906.

CHAPTER III

THE HUMAN BODY

ALTHOUGH Pithecanthropus was just on the border-line of humanity, there were in the Ice Ages which followed virile, strenuous types of mankind such as the woman of Piltdown and the man of Neanderthal. The great stride from the bestial to the human status seems therefore to have been taken in the Pliocene period. What is really involved in this change of state? Afterwards man relied on his brains rather than on bodily strength. Those ape characters which were at first indispensable, and are distinct enough in the Ice Age savages, even in some living primitives, are found to have disappeared in the more advanced races of mankind. But the skeleton, muscles, and soft tissues of the human body offer evidence unmistakable of the former lowlier status through which his ancestors have passed. There are two chief and distinguishing peculiarities which make plain most of the differences between man and other animals. These are the habit of standing erect or walking in a more or less upright manner, and the greater size and weight of the brain of man.

Almost all the differences in the skeletal framework and in muscular arrangement of mankind may be traced back to one or other of these two modifications. Dr. Munro suggested that the habit of walking or of standing came first, and that the development of the brain followed, for it was only after the "ancestor" could stand comfortably on his feet, that his hands could acquire dexterity and practice in the use of tools, and this preceded the

great development of brain.[1] Many animals are able to sit up or even stand in a more or less erect position. This is especially true of the Marsupials, of some Insectivoræ, Rodents, and Felidæ. A weasel can rise up quite easily on its hind-legs. Hares also will rise up on their hind-feet and box one another's ears; squirrels constantly sit up and use their hands freely. Many other instances could be given. In the great Primate order, which includes lemurs, monkeys, and anthropoid apes (as well as man himself), the habit of standing or sitting up is quite common. According to Major Tickell,[2] a Tenasserim lemur (Nycticebus) was observed to raise itself on its hind-legs and throw itself on an insect. Monkeys regularly sit up, and the higher apes can walk in a more or less clumsy position. The gibbons totter along, balancing themselves with their arms above their head; the gorilla hobbles, resting his knuckles on the ground. On the other hand, the ground-plan of most specialized types of four-footed animals hardly admits of their being able to stand up on their hind-legs at all.

The marsupials and others mentioned above (excepting the primates) are all of a rather low type, more or less primitive and not highly specialized for a four-footed existence, so that one is inclined to suspect that the common ancestor of all the primates must have diverged from the main line of descent of all the other animals at a very early period. Now, fossil lemurs are found in the Lower Eocene of North America, and fossil monkeys in the Middle Eocene—that is to say, the lemurs are one of the most ancient types of Mammalia. During the course of its development, every individual animal is supposed to pass through stages which repeat in a more or less confused way, the geological history of the species to which it belongs. The development or embryology of man has been very carefully studied. It is said that there are distinct traces during early stages of growth of some ancestral four-footed creature, but this was only

a generalized archaic type of animal. There are certainly as we shall show, later stages which distinctly remind one of the young lemur and young chimpanzee or gorilla. But in the whole course of development there is nothing that recalls other more specialized kinds of mammals. This again seems to show that the common ancestor of man and the primates was at a very early period differentiated from all other types.

From the original primitive four-footed creature with all its five digits exactly alike, the primate ancestor must have soon begun to specialize. It is curious that in the lemurs we find sometimes a single finger modified in the most extraordinary way to act as an insect probe or to strip bark from trees. In the monkeys thumb and big toe soon begin to be more or less distinctly different from the other digits. Such differences are, however, very slight when they are compared with the thorough-going alteration of the whole skeleton required by the erect stature and gait of mankind.

The head had to be poised or supported on the vertebral column, not slung on in front of the animal. A whole series of beautiful adaptations followed this necessity, such as the exquisitely fitted mosaic of moving bony pieces in the knee and ankle joints. Yet it is surely incorrect to say that the central position of the *foramen magnum*, or the shape of the ecto-cuneiform bone, BROUGHT ABOUT the ascent of man.[3] These, as well as all the other modifications, are surely but the *result following*, as engineering necessities, of the habit of standing or walking; they are effects of a changed habit. Moreover, this habit was not an accidental, meaningless novelty. The ancestor rose up on his hind-legs for a definite purpose. It may have been that he was unusually intelligent and inquisitive, and knew that he could get a better view by doing so. So that in the very first step upwards of the great ascent, the spiritual nature and brain of our ancestor had something to do with his development.

Amongst other alterations in the ground-plan of the human body which seem to be connected with the habit of walking and standing is the beautiful curve of the spine, which used to be known as "the Grecian bend," and the shape and firm yet flexible fitting of the vertebræ. The result is that the thrust of the weight can be supported alternately on either foot. A very young human embryo resembles the anthropoid ape of similar age in not having any such curve in the spine. The young ape never attains to it at all. Unfortunately, though it is often beautifully developed in young European children, it is often lost, for the habit of crouching over a writing-table destroys the proper balance of the body. The old-time sailor, also, whose life was spent more or less in the rigging of sailing-vessels, had a "shell back," strongly resembling that of the adult gorilla. The chest of the gorilla is enormously deep from front to back, but relatively narrow across, as one would expect in an animal which usually climbs or walks on all four feet. The shoulder-blade, collar-bone, and hip-joints are all different from those of man, and for the same reason. Yet most of these differences only appear in mankind with maturity, so that in extreme youth there is a greater likeness to the gorilla and other apes. The proportionate lengths of the arm and leg are also of great interest. The arms in most of the man-like apes are as long, or longer, than the hind-limb. Very young infants have arms almost as long as the leg. Some of the more primitive races of mankind also have the arm over-long, so that they have not specialized so far as civilized peoples.

Probably for the same reason the relative length of the forearm and upper arm differs in various races of mankind. In the chimpanzee the forearm is 94 per cent. of the length of the upper arm; in the negro and Fuegian it is 81·9 per cent., but in the European only 73·4 per cent. But one of the most interesting proportions is that of the length of the head to the total length of the body.

As we shall see, the great size of the skull is perhaps the most important characteristic of man; yet, perhaps in order to balance the head more effectively, the length of the head is small as compared with that of the body. As an infant grows up, the relative length of the head diminishes greatly. In young babies it is about one-fourth of the total length, but with full-grown Europeans the total height is from seven to eight times the head length. If we are correct in supposing that the European is the most advanced type of mankind, then it is quite in order, and we are not surprised to find that the full-grown African pygmy or Akka's stature is only six head lengths. The negro, or black race, the yellow, or Mongolian, and the Schuli (nigritic), seem less advanced than the European in this respect, for the total body length is only from six and a half to seven and a half head lengths[4] in these races.

The record for this particular measurement is held by a lady in the Island of Urk, whose height was nine and a half times the length of her head.[5] But even this is not unusual in the most beautiful human form, as understood by those whose livelihood depends on their fulfilling the ideals of beauty cherished by women in the twentieth century. I have found in the day's issue of a certain paper that the length of the head is only one-ninth of the length of the body. This proportion, and also the extremely small size of the waist, is of very great interest, for it shows that the ideals of beauty held by the Parisian dressmaker seem to be unconsciously projecting forwards the evolution observed in mankind through the primitive to the most civilized tribes. There is another proportion which is also of very great importance. When compared with that of other animals, the size of the stomach in man is quite extraordinarily small. This fact must have been a most serious disadvantage in early history. His food had to be of a concentrated character, and, as compared with other animals, he was obliged to

hunt often and eat moderately. A generous waist measurement is quite incompatible with the life of a wandering hunter. The gorilla, which uses all four feet to support his weight, can still retain an enormous paunch, but that was not possible for our ancestor. Shall we suggest that one of the latter's first dilemmas was whether he was to master his carnal appetite and run about, or allow himself complete repletion at meals and remain for ever four-footed? Another important peculiarity of mankind is, of course, the "opposable thumb" and the non-opposable big toe. In apes, and even monkeys, the power of grip between finger and thumb is of a rudimentary character. Very young human babies can hold on with astonishing strength. This in itself is an interesting fact, for it may be the last relic of the power to cling to its mother which used to be possessed by the infant monkey, or even by those baby lemurs, who are carried about by clinging, underneath, to their mother while she leaps from tree to tree.

But it is even more interesting to find that a human baby crooks its fingers, holding on by the curved hand, not between fingers and thumb. The soles of the feet of a very young baby are also inclined inwards. The gorilla walks on the outside edges of its feet, for the soles are similarly inclined; this arrangement gives it a much firmer grip of the branches when climbing. These are but a few of the many alterations in the ground-plan of the human body, perhaps due to the habit of walking in a more or less upright way.

Every muscle and tissue in mankind has been studied with extraordinary care, and compared minutely with corresponding features in the anthropoid apes. Yet one finds that there are only three human muscles which have not yet been found in any monkey. Not only so, but there are some thirteen minor peculiarities of bone or muscle which only occur in the human subject as rare and exceptional abnormalities, but which do occur regularly and

normally even in lemurs.[6] There is some reason to believe that the original ancestor was covered with hair or fur. The number of hairs found on a square centimetre of the skin was counted in a very young infant,[7] and also for the young monkeys and apes given below:[8]

	Man.	Orang-utan.	Chim-panzee.	Gibbon.	Macacus Monkey.
Number of hairs found on a square centimetre of the head	880	383	400	546	1,240
Number of hairs found on a square centimetre of the back	686	937	420	440	1,406

The results are interesting and unexpected, for it will be seen that the hairs on the human subject were more numerous in every case, except only those on the macacus and on the back of the orang-utan. Moreover, only man and the gibbon had most hairs on the head.

The most remarkable of all the differences between man and his nearest allies in the animal world lies in the shape and extraordinary development of the skull. It is interesting to note that in the human infant, even at an early period, the facial part (bones of the nose and cheeks) are overshadowed by the strong forward growth of the forehead and temples. But though this difference is clearly to be recognized, there are stages in which the European infant has characters which still persist in the chimpanzee or other anthropoids, as well as in some primitive savages. The form of the skull is at first more narrow and low in front and wider behind; the upper jaw projects forward and is heavy-looking (prognathic), like that of some negroes and negrittoes. The nose is at first broad and flat like that of a chimpanzee and of many low-caste savages.

Indeed, the general resemblance of a youthful human

skull to that of the young chimpanzee is striking at first sight, but soon becomes less distinct. The adult male ape develops a louring brow, bony crests and ridges on the skull, which give an impression of bestial ferocity. These ridges across the eyes in the eyebrow region, along the upper middle line of the skull, and about the attachment of the muscles of the neck are of great interest in the story of man. Those apes who flourished in the Miocene-Pliocene of Europe did not possess these features, at least, in so marked a degree. But there is a conspicuous brow ridge on the skulls of the man of Neanderthal and his Ice Age contempories. As we shall see later, it is sometimes clearly marked in Australians, and more or less suggested in modern Europeans (see p. 78). The middle crest persists in the Tasmanian, Eskimo, and occasionally in other primitive races. It is almost impossible to describe the shape of a skull in words; nor is it at all an easy matter to arrange skulls in an order of merit according to what we take to be the brain development.

All sorts of angular and linear measurements have been devised, carried out on hundreds of different races, classified and compared with a thoroughness and industry that is beyond all praise, yet with results that are not altogether satisfactory.[9]

One of the oldest of these measurements, the frontal angle of Camper (born 1722), does bring out prominently the forward expansion of the skull. A line is drawn touching the forehead and the front part of the incisor teeth; the angle made by this line with another drawn along the skull base (in line with the opening of the nostrils) is Camper's angle. The following examples show that it does not give a bad classification by merit:

	Ordinary Monkey.	Orang-utan: Juvenile.	Orang-utan: Adult.	Negro.	Kalmuck.	European.
Camper's angle	47°	58°	47°	70°	70°	80°

The young orang has a better angle than the adult, which is an interesting point (see p. 75).

In the time of Phideas, artists had already found out that an angle of 100 degrees gave the best artistic value. Roman sculptors, as Camper showed, preferred 95 degrees, which is "not so pleasing." If made more than 100 degrees, the appearance becomes grotesque, like that of a hydrocephalous idiot. But even this angle, besides being vague and indefinite, does not properly bring out the extraordinary expansion of the brain in man as compared with other animals. The size of the brain in most animals is limited by two determinants which are well shown by an ingenious diagram due to Dr. Duckworth. It is really the median section of of the base of the skull. The line *B P* represents the base of the skull; *N* is the root of the nose, and the line *B O* the plane of the foramen magnum by which the spinal cord enters the brain.[9] An ordinary animal requires a clear lookout forwards, so that *N* must be well above the base of the skull and *B P N* must be not more than about 135 degrees (see next page).

An ordinary fourfooted mammal, such as man's generalized ancestor, must have the neck more or less in line backwards with the spine, and with the skull forward so that the opening for the spinal cord cannot be more oblique than is shown in the figure. It follows that the angle *O B P* cannot be much more than that shown—viz., about 135 degrees. All the brain, therefore, has to be packed into the space between *P N* and *B O*. But in the higher apes and man these limitations do not hold. The nose is brought down far below the summit of the skull, and the central poising of the head allows *B O* to be brought much farther round. The base of the skull can also be inclined upwards. The angle *N P B*, therefore, can become more than 180 degrees, perhaps 210 degrees, and *P B O* can be as much as 150 degrees. Neither the necessity of clear forward vision nor those connected with the support of the head interfere with the growth of the brain. So far, then, as these limitations

go, there is no limit to the possible expansion of the skull in man.[11]

We have tried to explain this ingenious measurement of Dr. Duckworth's because it is a specially good illustration of the extraordinary increase of the brain in mankind. But this figure only refers to length, and the brain, in consequence of its central position, can expand not only in length, but in breadth and height without being checked by those mechanical difficulties which apply to all fourfooted creatures. There is much variation

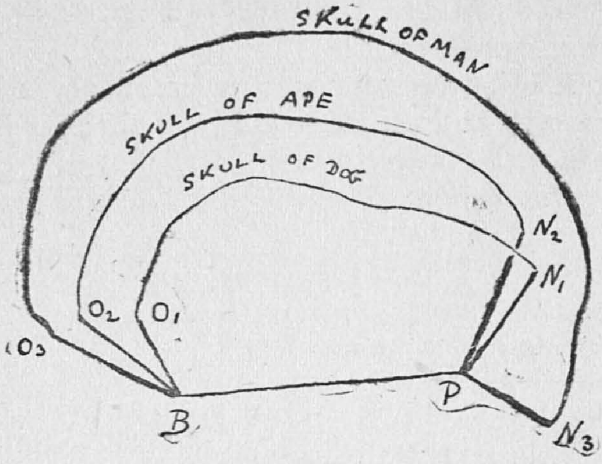


FIG. I.

B to *O* represents the line of the foramen magnum, *B* to *P* the base of the skull; *N* is at root of nose. The brains of the dog are confined in space $P\ N_1\ O_1\ B$, those of ape in $P\ N_2\ O_2\ B$; but in man, owing to swing forward of line $P\ N_3$, a much larger space, $P\ N_3\ O_3\ B$, is available.

(Compare Duckworth, *Morphology and Anatomy*.)

amongst the different races of man in the breadth of the skull. In some (dolichocephalic) the skull is relatively long, the breadth being from 62 to 75 per cent. of the length. In rounder headed types it is relatively much broader; the breadth may be from 80 to 92·77 per cent. (brachycephalic).[12] This percentage, or cephalic index, is a

very valuable race character; but, like all other artificial distinctions, it is not always a safe guide.[13]

In early youth the skull is always more broad or brachycephalic than in the adult; women also have usually rounder heads than men of the same race. The same rule seems to hold in the Primate order, both for monkeys and the higher apes. Many primitive races of mankind, as well as the Neanderthal or Glacial man, the Mediterranean race, and the Jews, are or were originally long-headed (dolichocephalic). But there are also primitive and even fossil races which are or were round-headed (brachycephalic), so that it is very hard to see which was the original arrangement.

Perhaps long-headedness was a secondary necessity forced upon man during certain early periods; but it would be incorrect, even dangerous, to hint that the dolichocephalic Teuton is more primitive than the brachycephalic Russian.

Cephalic Index.

	Young Male.	Adult Male.	Female.
Cebus monkey	74·8	72·7	—
Mycetes monkey	85·8	79·6	—
Gibbon	82	78	—
Orang-utan	89	84·5	—
Australian aborigine[14] ...	—	71·29	73·36
Greater Russians[15]	—	81·48	84·16

To show how perplexing the results of complete trust in the cephalic index may become, we give another table illustrating some of the chief characteristics of the Jews, of whom Dr. Weissenberg (the author of the measurements) says: "No one denies that the original Jewish type was dolichocephalic." One would also think that no other race is so pure and free from foreign intermixture.

Yet these differences show that even the Jews probably contain two types—a brachycephalic and a dolichocephalic.[16]

CHIEF CHARACTERISTICS OF JEWS.[16]

	New York.	Turin.	Grüss.	Berg.	South Russia.	Yemen, Arabia.	Mesopotamia (Men).	Mesopotamia (Women).
Mean cephalic index... ...	82	82	85·9	84·7	82·5	74·3	78·3	78·1
Percentage, dolichocephalic	—	—	0·0	0·0	1·0	66·7	13·5	25
Nasal index ...	—	—	58·6	61·4	63	61·1	60·7	58·5
Percentage with Semitic nose	—	—	36·4	40·0	10	10	62·3	66·7
Blondes ...	—	—	0·0	0·0	10·5	0·0	0·0	0·0
Brunettes ...	—	—	84·9	90	58	100	83·8	100
Average height	—	—	1,636	1,640	1,651	1,594	1,641	1,525

The nasal index indicates the relative breadth of the nose as compared with its height. Both the nose index and the average stature are amongst the most useful criteria of race. Is it possible, from amongst the bewildering variations, permutations, and combinations of characters, which one finds in the living races of mankind, to extract the salient features of an ideally intermediate ancestor? It could be done by calculating the means of every known and measured character, but it is not worth while to do so, for the result would be assuredly misleading. The ancestor, for instance, would not be intermediate in height between the tallest and the shortest of living races, but more probably as short as or shorter than the pigmy. It is also more likely that he was brachycephalic, and not mesaticephalic. So that averages are misleading. Yet it is possible to give a rude blurred picture of the Pliocene precursor when he was just on the point of venturing on the great step upwards, and this we shall now try to do. His body would be covered with hair or fur, except on the palms or soles of his feet. On his head the hair grew long and thick, and was continued in all probability down his cheeks and chin to form a combined beard and whisker fringe. We do not think he had much of a moustache, but probably his eyebrows "beetled."

The hair was wavy or curly; it may have had a tendency to be lank, straight, and stiff on his head, but this is doubtful. It was not so woolly as that of the negro. His children probably had a rich Titian red or bronzy coat of fur, like that which one sees on young Galloway cattle. In the epidermis as well as in the hair were both black and orange pigment, but on the whole he was probably moderately dark skinned.[17]

The face would probably be low and broad as compared with modern races.[18]

His nose would be as broad as it was long, with nostrils wide apart, and facing a little upwards and outwards. The bridge would be almost concave upwards, and the nose itself—all that there is of the most retroussé. The eyes were small and deeply sunken under the rather prominent eyebrow ridges. It would not be easy to distinguish the peculiarities of his jaw on account of the hairy beard and perhaps it was best so, for he had no real chin and a very retreating lower jaw; a long and narrow, as well as projecting or prognathic, upper jaw; heavy cheek-bones, and extremely large teeth, often with five roots to them. Those muscles which are at work when chewing hard food would be enormously developed, but those which are used in speaking would be feeble and weak.

Seen from in front, his appearance would be the reverse of prepossessing—the narrow receding forehead, beginning with its strong eyebrow ridges, would seem to disappear under the mop of dark thick hair, out of which the little ape-like ears could hardly be seen. He might have stood about 4 feet high, with hands, when so standing, reaching to the knee; both hands and feet would be large; chest narrow; he would be slightly bandy-legged, but nothing to signify, for even at this period he probably chased small animals and hunted on foot. At night he would retire to a roughly woven nest in the branches of a tree. When sleeping, his head would be bent forward over his wrists; these would be crossed in front of his chest, with elbows

down and outwards. His legs would be strongly bent or flexed, so that the knees were also near the wrists. His waist-measurement would be excessively small, or he could not assume this position, which is, as a matter of fact, hardly possible, and certainly painful for civilized man. On a similar nest, close by, would be his wife or wives, with Titian red or bronze babies sound asleep, and yet clinging round their mother's neck.

Should a raging gale, with sheets of driving rain, fall upon him, he would still sleep on. The rain would be conducted away by his hair and beard, by his elbows and hip-joints, so as to drip nearly clear of the face and body. The hair on the arm, even of those civilized men who retain sufficient to trace the arrangement, turns *down* both upper and forearm to the elbow; outwards and downwards from the wrist. Moreover, if the reader tries to realize this attitude, he will see that what with hair, whiskers, beard, and eyebrows, even midges and mosquitoes might be puzzled; they might lose heart, being diverted and led astray by the tangled labyrinthine masses of his chevelure. But we must leave him in this position asleep, perhaps dreaming—*i.e.*, apprehending by his senses some particularly delectable dainty (perhaps with corresponding motor reflexes), for it is necessary to consider carefully what may be safely said of his mental ability and moral accomplishments.

[1] Daniel Giraud Elliot, *A Review of the Primates*, 1912.

[2] According to Elliot Smith, the brain enlarged first, and an erect habit followed (Brit. Assoc., 1912).

[3] Heinemann, *Physical Basis of Civilization*. Chicago, 1908.

[4] Stratz, *Arch. f. Anthrop.*, 1909 and 1911.

[5] *Ibid.*

[6] Full details will be found in Dr. Duckworth's *Morphology and Anatomy*. It hardly seems necessary to quote these peculiarities in full, for we have not space to explain the technical terms involved.

[7] Prenatal about six months.

[8] Meyer Lierheim, *Zeit. f. Anat. u. Anthrop.*, 1912.

[9] Czekanowski complains that many researches are only *sterilen zahlenspielereien*, for which charge there is some foundation. *Arch. f Anthrop.*, 1911.

[10] *N* is the nanion ; *O* the opisthion.

[11] It has been shown that the increase in size of the European skull already involves gynæcological difficulties.

[12] Stolyhwo, *L'Anthropologie*, 1908, p. 205.

[13] For instance, Tschepourkovsky, *Biometrika*, 1904. Stature seems to influence relative and actual length of the head. Aurel von Torok found that of 5,986 individuals, 3,034 were dolichocephalic and 2,220 brachycephalic, yet only 2,044 had long heads and 1,971 short heads. *Arch. f. Anthrop.*, 1905-06.

[14] Dr. Robertson, Proc. Roy. Soc. Edin., vol. xxxi., 1910.

[15] *Ibid.*

[16] The first two columns from Guiffrida Ruggeri and Viasemsky, *L'Anthropologie*, 1911 ; the remainder from Weissenberg, *L'Anthropologie*, 1904, and *Arch. f. Anthrop.*, 1909 and 1911.

[17] Changes of this character occur in the pelage of some monkeys and lemurs (*Pithecia leucocephala, Mycetes caraya, Lemur macaco*). There is extraordinary variation in beard, moustache, and whiskers in monkeys and apes (Gray, *Nature*, February 27, 1908; Dubois, *Man*, 1908, 46)

[18] Hagen, *Kopf. u. Gesichtstypen*, etc., Stuttgart, 1906; and Schwerz, *Arch. f. Anthrop.*, 1911.

CHAPTER IV

THE LIMIT OF HUMANITY

It is surely unnecessary to discuss the question of whether there is a limit of humanity or not. Common sense of mankind, whether in civilized or savage communities, draws an unmistakable boundary between the best animal and the worst man. But if we were to attempt to define this limit, we would at once be confused in psychological and metaphysical subtleties, which, however diverting they may be, never seem to lead to a definite result. This admitted difference between men and beasts must not, however, be overmuch magnified or allowed to obscure obvious facts.

Theories of "*instinct,*" or "anthropomorphic explanation," when employed as a term of abuse, rather confuse than clear up the questions concerned.

Great as the differences may be, yet somehow or other some animal or animals did manage to rise from the bestial to the human status. The great gulf between the animal and the human being is not by any means so distinct to children or to savages as it is to the civilized European.

Nor, apparently, are the distinctions so clear to those Europeans *who understand animals best*—that is, shepherds, dairymen, and others, who can only succeed in their profession if they are in real sympathy with the animals under their charge. In the last chapter we tried to show that there is, in spite of many changes due to development and acquisition, an underlying family likeness in the bodily structure of man and the other primates, which is specially obvious when young stages are compared. So

when we try to understand the actions of animals, we seem to find a sort of infantile reasoning power, embryonic states of affection, jealousy, courage, and cruelty, perhaps even germs of goodness and wickedness. Or to put the matter in another way, if any of our readers has been on terms of sympathy with a clever fox-terrier or dandy, if he has watched a Scotch collie at work, or if he has endeavoured to stalk any kind of wild animal, then we affirm with confidence that he knows from his own experience that the ways in which an animal acts are often just those ways which would be adopted under those particular conditions by a clever human being.

One cannot expect the reasoning power to be anything but feeble, and only occasionally manifested; the emotions are also indistinct and transient; but our point is that germs of intellectual and emotional possibilities do exist in the animal world. The root of most useful knowledge lies in the power of profiting by experience, and even the very lowest groups of animals are sometimes able to do so.

A minute and lively creature, Paramœcium, familiar to all who have once used a microscope, is said to be taught by experience. When kept in a very fine glass tube, Paramœcium has considerable difficulty in turning round. It has to twist its body into the shape of a V, and at first required four or five minutes to accomplish this acrobatic feat. But after twelve hours' experience of life in the tube, it could turn round in one or two seconds.[1] The common earthworm has sometimes to solve a rather difficult proposition, for it must drag the leaf of a lime or of a rhododendron into its burrow, which is not wider than the diameter of its own body. It solves the question in quite a reasonable way by dragging the lime-leaf in by the pointed tip, and the rhododendron by the base or petiole. This was pointed out by Charles Darwin.

Messrs. Yerkes and Huggins devised an ingenious method of testing the intelligence of crayfish. A path dividing into two byways led to the waterside. After they

had become accustomed to go by either of the two bypaths, one of them was closed. Fifty per cent., on an average, of the crayfish in the first series of trials went by the right path, for it was naturally just as likely that they would go by one as by the other. But in the second series 60 per cent., in the third 75·8, in the fourth 83·3, in the fifth 76·6, and in the sixth series 90 per cent. of the crayfish chose the right way.[2] This means that only 10 per cent. of these crustaceans had *not* been taught by experience. Even tortoises may be said to show occasionally an affectionate disposition. Gilbert White mentions one that was apparently very fond of a certain old lady, and always hobbled towards her with "awkward alacrity" whenever she came in sight.

Birds resemble human beings in their relatively large brain, and in their holding themselves more or less upright. One does not usually think of birds as specially intelligent; but of all wild animals, certain birds, specially wild geese, are perhaps the most difficult to stalk. These, as well as rooks and others, place sentinels for the flock, and the sentinels understand their duties, and are punished if they do not perform them. The eyesight of some birds is in all probability better than that of mankind; this can hardly be said of any other animal. Birds'-nests show a mastery in the art of weaving or twining that is not reached by other animals (excepting insects); even the nest of the gorilla or orang-utan is but clumsy and rude if compared with that of ordinary birds. Rooks will carry off acorns and dash them to pieces by hammering against a stone. It has been stated that certain birds use tools; at any rate, they are said to thrust small pieces of stick between the open valves of sea-shells.[3]

A new type of poultry-feeder requires a certain quickness of intelligence in hens and chickens. A muslin tube containing Indian corn is attached by a mechanical contrivance to a large tin full of wheat or other grain. When the bird pecks at the muslin tube, the grains of wheat fall

out from above. They seem to understand at once what to do, and require, in some cases, no teaching at all. After giving a perfunctory peck at the muslin, they hurry to where the wheat will fall. The classical chick of Lloyd Morgan must, of course, be mentioned. This bird had tasted a certain nauseous caterpillar, and when a second specimen was thrown to it naturally hurried to the place, but as soon as it recognized the objectionable caterpillar, it stopped, wiped its bill, and turned away. Moreover, the artistic plumage and the singing of birds give pleasure not only to us, but to the singers themselves, and their sweethearts and wives. So that, in many respects, birds are far beyond the ordinary level of the brute creation.

It is quite unnecessary to give numerous instances from the world of insects. We must, however, mention certain ants in the valley of the Amazons, who are, at least in one respect, more intelligent than many savages. A large part of this district is inundated every year to a height of several feet. These ants, which are described by Dr. Ule, build their nests in the trees. They carry up to these nests not only particles of earth, but the seeds of certain special plants. When the seeds germinate and the plants grow, their leaves protect the nests from heavy rains and from scorching sunlight. There are also other ants that sow, manure, and cultivate regular crops of fungi.

These instances of animal sagacity are perhaps sufficient. We shall exercise forbearance, and refrain from describing the intelligence either of our own or of our neighbour's dog, for we are convinced that every reader of this book will know of instances perhaps more remarkable than anything which we could bring forward. But seeing that lemurs and monkeys are the nearest allies of mankind, it is necessary to see how far they have travelled in this direction. In America, experimenters seem to be partial to using "puzzle-boxes." The animal is shut in a box, and can only get out by pulling a string or working a more or less

complicated system of knobs, catches and bars. Messrs. Thorndike and Haggerty carried out many experiments with these contrivances, using monkeys, dogs, cats, and chickens. Monkeys were the quickest to learn how to work the various devices. Moreover, only monkeys seem to have had enough intelligence to watch other monkeys so as to learn how to get out. There is a certain artificiality in these tests; it is from observations of monkeys in their own jungles that the most valuable results are to be expected.

In Madagascar the natives say that it is exceedingly dangerous to throw a spear at the Indris lemur. The animal will catch the spear in its hand, and throw it back with great force, and never misses.[4] The author enjoyed the privilege of listening to many Malagasy stories during six months of travel in the great African island. No people, whether savage or civilized, possess quite the same exquisite art in the embroidery of a tale as the Malgache. Yet there is *as a rule* a foundation of fact overlaid by an incredible profusion of decorative ornament in most native stories, and it is quite likely that an Indris lemur did throw a small twig at a Malagasy.

Monkeys undoubtedly do so. Miss Romanes possessed a Cebus monkey which could use a hammer to crack walnuts. A stranger was brought to see this trick performed, but unfortunately the nut turned out to be a bad one. The monkey looked so dejected that the visitor laughed at him, upon which he at once flew into a passion, and threw at her everything that he could lay his hands upon, first the nut, then the hammer, then a coffee-pot, and finally, one by one, all his own shawls. He threw things with great force and precision, standing erect and extending his long arms well back over his head.[5] In South America, there are reports from a great number of observers all tending to show that in the early Spanish days the Mycetes monkey used to defend itself by throwing sticks, dirt, etc., at strangers; at least, this is said to be the case

by Oviedo, Cieza de Léon, Dampier, Wafer, and Exquemelin, most of whom state that they actually saw the twigs thrown by the monkey. Wafer and Yves d'Evreux also say that they saw monkeys break oyster-shells and crack fruit with stones, whilst Acosta saw a monkey take up a stone and throw it at children. One man had two teeth broken by a stone hurled at him by a monkey.[6] The author has not noticed any confirmation of these statements by recent observers, but that proves nothing; for if these monkeys do possess intelligence, they would soon learn that in the days of firearms instant flight is by far the safest proceeding. In the Old World baboons and other monkeys defend themselves in the same way.[7] Dr. Wallace himself saw an orang-utan breaking off fruit and twigs to throw them at the intruder. On one occasion one of these Mias' kept up a perfect fusillade of heavy branches and the spined fruits of the Durian for at least ten minutes.[8]

But there are other instances which show a germ of general handiness and dexterity in the primates. The weird aye-aye lemur uses its finger to probe for insects, and taps the wood with it, apparently judging by the sound if there are caterpillars inside.[9]

A chimpanzee "Molli," was kept in a wooden cell. Someone drove in a nail from the outside, whereupn Molli took up a metal drinking-vessel and pounded the nail back.[10] Mr. Hobhouse's Rhesus monkey used a stick to draw a larger stick within his reach. With the big one he could reach and drag a banana within a convenient distance.

Many other instances will be found in the work of Holmes, so often quoted. Another chimpanzee, "Peter," copied the letter W on a blackboard.[11] This shows an extraordinary precision of eyesight. According to Isidore Geoffrey St. Hilaire, a certain American monkey could distinguish the figures in an engraving; it was afraid of a wasp or cat in pictures, and tried to catch the figure of a

grasshopper.[12] These instances cannot be said to prove that monkeys are users of tools, but they show that monkeys do use things as tools.

But another remarkable point is the fact that both lemurs and certain apes make nests which involve a certain choice in materials and the power of rudely twining or twisting grass and twigs. The aye-aye lemur has a nest two feet in diameter, which is made of rolled leaves of the traveller's tree, and lined with twigs and dry foliage, and the entrance is at one side.[13] Both the gorilla and orang-utan build nests in trees. That of the former is at a height of fifteen to twenty feet above the ground. Branches are broken and bent together, then covered with twigs and leaf or moss. The foundation of the nest of the orang-utan is formed of intertwined branches, on which smaller ones are laid crosswise, and it is then lined with leaves such as those of certain orchids, Pandanus, and Nissa.[14] So that even far below the level of mankind one distinguishes latent possibilities of basket-work, weaving, and plaiting.

For moral worth we have no means of measurement,[15] but in a general way it is clear that good qualities—at least in an embryonic state—exist amongst primates. Some lemurs are very affectionate and gentle to those who make pets of them, and some are fond of playing with a ball. Others are shy, morose, and dejected in captivity. Monkeys are extremely inquisitive and mischievous, and are capable of real love and decided hatred. Sociability is a very marked characteristic of baboons and certain monkeys. Sentinels are posted, and they know their duties, and are well aware that they will be nearly torn to pieces if they neglect to keep guard. Nor are instances of self-sacrifice and heroism unknown, for there is the well-known case of a large baboon which came down from his place of security to the rescue of a young one which had been left behind, and was nearly surrounded by the dogs. By his bold behaviour and loud grunts, he

diverted attention to himself and allowed the little one to escape.

The gorilla will, it is said, stand up to an enemy, and only retreat when the female and young ones have reached a place of safety.

Coquerel had a certain lemur (*L. variegatus*) in captivity. Every morning, as soon as the first rays of the morning sun reached it, the small creature would sit up on its hind-legs and open out its arms, holding them in this position and gazing at the sun intently. What were the feelings of comfort — perhaps of grati-

FIG. 2.—A SOUTH AMERICAN RUBBING A BOW SMOOTH WITH THE HELP OF AN ANIMAL'S SKULL (AFTER CREVAUX).
(Frobenius, *Childhood of Man.*)

tude — that pervaded the smooth brain of this little animal?

One might even suggest that our Pliocene ancestor, just before he became man, had so far trained his eye and hand that he could hurl stones, branches, and other things at his enemy, and probably hit him; that he could crack shellfish or hard fruits with a stone, and twine creepers or twigs together. He could certainly break off a branch, and would have no difficulty in tearing off the twigs. *Indeed, if the idea had occurred to him*, he could have made a rude club, split off a bamboo splinter, improved a stone by rudely chipping it, or even made a handle for the

stone by bending a withy round it. But until he had reached the limit of humanity, this idea would *not* enter his brain, or if it did, he would possess neither the patience nor the intelligence to carry it through. The boundary-line is definite enough, and the difference is clearly in brain and not in eyesight or in manual dexterity.

Comparison of the brains of apes and of men show, as one would expect, considerable differences; yet, on the whole, one is more astonished at the general likeness than impressed by the contrasts. We have, of course, assumed in the preceding that the difference in intelligence is really connected with the brain and not with the heart or the liver, as various nations have supposed. It is not very easy to prove that increase of brain always accompanies increasing intelligence, but the table which follows shows that *on the whole* this seems to be the case:

	Brain Capacity in Cubic Centimetres.	
Wiltshire Englishman (Gros Propriétaire)	1,900	
	1,875	
	1,850	
Wiltshire farmer ... ... Highland doctor (colosse)	1,825	
	1,800	Parisians of to-day, 5·2% exceed this.
	1,775	
Highlander (grand cultivateur) ...	1,750	
	1,725	
Eminent Scotsman, Principal of a University ... ... Average of Portuguese Government officials	1,700	No Parisians of Neolithic Age exceed this.
Average of Portuguese "inactifs" ...	1,675	
Neanderthal race (Spy II.)	1,650	
Neanderthal race (La Chapelle) ... Average of Portuguese liberal professions	1,625	
Average of Portuguese commercial men...	1,600	Parisians of to-day, 47·7% (1,600–1,500).
Average of Portuguese day labourers ...	1,575	
	1,550	
	1,525	
Neanderthal race (Spy I.) ... ... Eminent Irishman (Physiologist), F.R.S. Eminent Highlander (Anthropologist) ...	1,500	
	1,475	Parisians of thirteenth century, 37·7% (1,475–1,400).
	1,470	
	1,450	
Ipswich man (Pliocene or Early Neolithic)	1,425	
	1,400	

	Brain Capacity in Cubic Centimetres.	
	1,375	
Irishman (modern)	1,350	
	1,275	Parisians of Neolithic Age, 30%.
Scotchman (modern)	1,250	
Neanderthal skull	1,225	
Modern Australian aboriginal	1,200	Below this limit are the following: 50·9% Hottentot Bushmen; 45·3% Australian; 8·3% German; 1·9% Chinese; 17% Parisians (Stone Age); 20·8% Parisians (twelfth century); no Parisians (nineteenth century).
	1,175	
	1,150	
	1,125	
	1,100	Below this limit were eleven female Californian skulls.
Gibraltar skull ... ... / Piltdown skull	1,075	
	1,050	
	1,025	
	1,000	Range of twenty-one ancient Peruvian skulls (female).
	975	
	950	
	925	
	900	
Lowest of modern Tyrolese	875	
Pithecanthropus	850	
Gorilla	600	

Looking at this table in a broad, general way, it seems clear enough that as the centuries proceed, the brain of man becomes more voluminous, and in all probability his intelligence increases.[16] But such a person as "Dr. Illingworth of Edinburgh" would quarrel even with this statement. He would make objections as, *e.g.*, The principal of a University (a Scotchman too) has 200 c.c. less brain than the Gros Propriétaire in Wiltshire, and only 50 c.c. more than an Ice Age savage (Spy II.). He would ask why Portuguese Government officials are so much above the average of Parisians? He would point out that the difference between the gorilla and the lowest European brain is only 275 c.c., whilst that between the lowest and the highest European is 1,025 c.c. But two points must be carefully borne in mind.

It is, first, impossible to judge the intellectual powers of our fellow-men by any standard. When different chances in life and different circumstances intervene, any attempt to do so becomes ridiculous. The man of Spy endured a strain on nerve of which most of us who have never known the fear of sudden death can have no conception. He had to think hard, to decide promptly, to weigh every possibility of danger in a few seconds, or die horribly. It would be possible to live a life comfortably out in a modern city, and never to have really thought very hard about anything. Nor could one say that a farmer or landed proprietor would be any the worse for an intellect as good as that required of the Principal in a Scotch University. He would certainly find plenty of use for it. Then, secondly, the very basis of the calculation is at least doubtful; it is not so much amount as quality of brain that matters.

Dr. Berry has shown that there are very marked differences in the relative development of the various lobes in the Australian as compared with the European brain.[17] Then, again, the methods of determining brain capacity have been questioned. In order to remove this last objection, the weight of the brain has been calculated. Unfortunately, the heaviest brain known, weighing 2,850 grammes, was that of an epileptic idiot. Still, the general results bear out exactly what has been suggested above.

On the whole, the greater the weight of brain, the higher is the intelligence. It was found that in 23·8 per cent. of people mentally deficient the brain weighed less than 1,200 grammes, and in only 4·8 per cent. over 1,400 grammes, as compared with 2·1 per cent. under 1,200 grammes and 44·3 per cent. over 1,400 in mentally sound cases. The weights of the brains of ninety-eight eminent Hessians (poets, philosophers, naturalists, statesmen, soldiers, doctors, and jurists) were compared with the average population. It was found that of these illustrious

ones, 9·5 per cent. weighed over 1,700 grammes, and 54·2 per cent. over 1,450 grammes, as compared with, for the average man, 0·4 per cent. over 1,700 grammes, and 25·4 per cent. over 1,450 grammes. Even the size and circumference of the head has been used as a measure of the intelligence within it.

Careful inquiries were made by Pfitzner in the various hatters' shops in Vienna. It was found that the higher priced the hat, the larger the size most frequently asked for, the inference being that richer people have on the whole the largest heads.[18]

	3 Marks.	6 Marks.	7 Marks.	12 Marks.	24 Marks.
Sizes most often required in cm. ...	56	57	59	60	61
Average size in cm. ...	54	55	56	57	58

On the whole, then, it is probable that the increase in volume and weight of the brain, which is the most remarkable speciality of man as compared with other animals, is connected in some way with the development of intelligence, or, as Hrdlicka puts it, "animalism varies with antiquity." It is also clear that "the thoughts of man are widened with the process of the suns." But what was it that initiated this development? In a young growing skull, every one of the bones which are to form the future cranium is separate, and, up to a certain point, independent. They are not in contact with the developing brain, being divided from it by a space occupied by "soft, sodden, spongy arachnoid tissue."[19] In some mysterious fashion, nevertheless, the growth of the brain governs that of those still independent pieces of the future skull. They are, of course, held together, and must affect one another's development.[20]

But at a certain period of growth, other influences begin

to exercise their sway. The thin curved plates of bone come in contact, being only divided by "sutures," or lines of meeting; then these sutures close, and in old skulls become obliterated altogether. The erect carriage of the head in mankind seems to begin to exercise an influence at a very early age upon the closing up of these sutures. The basal and the frontal sutures in man become closed at a much earlier period in the human than in the ape skull.[21]

But the lines or sutures on all the upper part of the skull-case remain in human skulls open for a much longer period. Now, if one compares the mature gorilla skull with that of an adult human being, two differences are specially remarkable. The great forward projection of the face is marked even in the young gorilla, but enormously massive in the adult male. The lower jaw is also heavy, and the molar teeth are very large.

Imagine the young gorilla chewing its food and manipulating this relatively huge jaw. It, of course, is supported and worked by muscles, which are attached to the front and sides of the skull. As soon as these muscles begin to exercise full activity, they obviously require a solid bony attachment, and hence the sutures in all this part of the gorilla's skull close at an early age. This must surely check the forward and upward expansion of the skull.

Then, at the hinder part of the skull, there are in the gorilla bony ridges, to which the powerful muscles of the neck are attached. In man the corresponding muscles merely hold the head in position, but in the gorilla they have to support its weight; and, perhaps for this reason, are not only far stronger, but cover by their insertion a much greater proportion of the cranial surface. An interesting suggestion has been made by Wetzel[22] in connection with these muscular strains, which are supposed to have an influence on the growing skull. The whole skull-case, consisting of all the different plates

of bone (still not united), must be thought of as *trying to expand* and to enlarge by curving upwards, in consequence of some stimulus, due to the growth of the brain itself.

Upon this developing cranium the strong neck muscles at the back and sides, as well as those others which work the heavy jaw in front, must hinder and check the expansion of the skull. In the case of mankind, the attachments of all these muscles, both those of the neck and those of the lower jaw, are so low down the skull, so much below its highest point, or even the widest part of its circumference, that these strains, instead of hindering expansion, should actually favour it. So after a certain stage, the drag of the muscles of the jaw and those of the neck, *being exercised below the widest parts of the skull*, would help instead of hindering the development of the brain. Moreover, when this process had begun, further development would only increase the growth in width and height. The figure explains this most attractive theory. It is interesting to notice how very near the young chimpanzee and gorilla have got to the critical point. But their further development is checked by the huge development of the face and of the heavy jowl, with its ferocious canines and great crushing molars. Moreover, the face, jaw, and teeth require in the gorilla enormous nourishment during their formation, and all this material is no longer available for the upper part of the skull. This also must tend to check the development of the brain and skull.

In man, as soon as the head was habitually carried erect, and when the teeth ceased to be used for worrying enemies, or as prehensile organs, which would be the case as soon as the hands were accustomed to use tools, there was nothing to prevent the skull increasing in another direction — that is, in *breadth*.[23] This made a great economy of material possible. Broad cheek-bones and a relatively wider surface for the attachment of the

muscles made the whole snout-like facial prognathism of the gorilla unnecessary. So the face was greatly diminished, the nose became flat and snubby, with nostrils wide apart, as one sees in some primitive races.

But perhaps the most remarkable consequence of these changes was their effect on the jawbone. This is

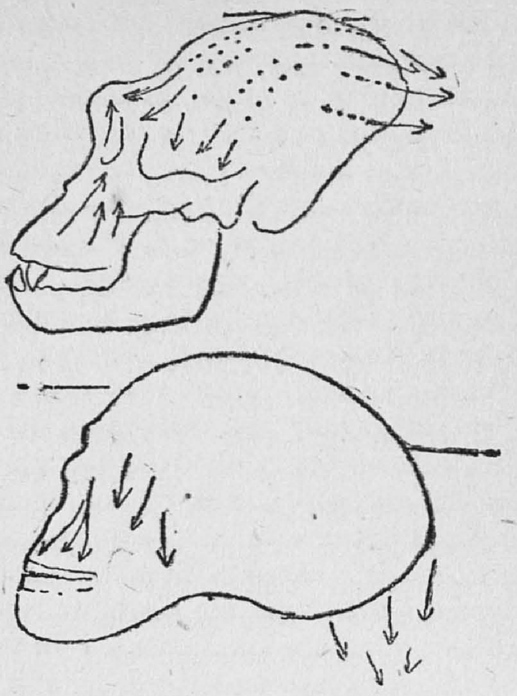


FIG. 3.—THE SKULL OF AN APE COMPARED WITH THAT OF A VERY PRIMITIVE TYPE OF MANKIND.

The arrows show the differences in the direction of the tensions and pressures (see text).

one of the earliest bones to appear in mankind ; it consists at first of two separate pieces, which unite to form certain bonelets, the "ossicula mentalia," which appear at the point where the chin is formed. Now, as Linnæus had noted, the chin is a peculiarity of *homo sapiens*. No ape possesses a true chin, and it is absent in the two earliest

known human fossils, the Mauer jawbone, and probably also in that of the Piltdown woman. But as the long, narrow jaw of a gorilla-like ape changed, in consequence of the broadening of the skull and the shortening of the face, into a shorter, rounded-arch shape, then great strain and cross-tensions would be thrown on the extreme forward points of the jawbones. If the origin of bone-forming tissue may be due to muscular stresses and strains, then the production of bone-forming tissue at this point would be favoured.

As soon as the human round-arch-shaped jawbone was produced, the formation of a chin was clearly a mechanical advantage. At first, as in the Ice Age (Neanderthal) race, the chin is but small; but the jawbone is still massive, and the teeth very large. Just after the Ice Age we find another people, the race of Cromagnon. Their chin is magnificent; quite as stubborn and projecting as the best we can produce in Europe to-day.[24]

The gorilla and some other apes have an extraordinary bony ridge over the eyebrows, which means a louring brow, and gives an impression of bestial ferocity. This is not so marked in the juvenile gorilla, and is hardly present at all in some of the Miocene-Pliocene anthropoids. It has been suggested by Dr. Görke[25] and others that these bony prominences over the eyes are necessary for an animal with an heavy jawbone, large molars, used for crushing hard food, and a *retreating forehead*.

Whenever the lower teeth strike against the upper, a sort of jar, or line of strain, passes up the bone. If the forehead is nearly vertical, as in most civilized races, this will have no effect, for the pressure will be distributed away. But with a very retreating forehead and projecting upper jaw, the lines of pressure would enter the skull-case at an oblique angle; a development of bone here would give the requisite resistance.

These eyebrow ridges are a prominent feature of the

Neanderthal race, of some living Australians, and occasionally appear in the Great Northern, or Teutonic, race. They dwindle to "an ornamental sketch" in some Neolithic peoples, and are usually absent in Europeans. We should perhaps mention two other primitive characters of the skull. The rounded forehead ("front bombé") of some negrittoes is an infantile character. With the broadening of the head, and even with a strong jaw, this characteristic seems to disappear. The second peculiarity is a curious crest, or ridge, along the median line of the skull in front and above.

This is perhaps descended from the strong bony crest which reinforces the eyebrow ridges of the gorilla and other apes. Sergi[26] has traced this character in a great number of primitive and other races, especially in Tasmanians, Australians, Fuegians, Eskimos, the Lagoa Santa race, some Californians and Patagonians,[27] a few Polynesians, and perhaps the Bataks of Palawan.[28]

The romance of the teeth of mankind has been fully explained by Osborne, Gaudry, and others. The human canine tooth is perhaps nearest to the very earliest type of tooth, nor do our incisors, still used to hold or bite, differ much from very early forms. In the premolars and molars remains of the primitive three-peaked arrangement can still be distinguished. The first simple cone-like tooth developed two other cones or peaks, two on the outside in the upper, and two on the inside in the lower, jaw. The resulting triangles of three peaks gave a perfect shear, well adapted to tear flesh from the bone or to crush beetles and grasshoppers. The carnivora still preserve this trituberculate type; but when crushing was required, the basal part of the tooth (the plain out of which the peaks rise) expanded into cusps. Even the Eocene lemurs, such as Miacis, show this development.

The molars of the chimpanzee and other apes have five and even six cusps. The fifth cusp is still present in Tasmanian and Negro teeth, but has disappeared in

modern Parisians.[29] The teeth of the Piltdown woman and of the Neanderthaloids resemble those of some native races to-day, and are very large and much worn, showing signs of strenuous mastication. But with, as it has been suggested, the invention of the cooking-pot, signs of degeneration set in. It was no longer necessary to chew hard grains and tough muscle.

The future is in this respect lurid and threatening. Teeth are growing smaller and weaker. The third molar is "practically always degenerate," and sometimes absent. Decay of the teeth seems to have begun to be a serious matter even in the Neolithic period, and in the future there is reason to fear that the European will become toothless in the prime of his youth, reverting to the state of some worm-like ancestor.

Very little can be said of the senses of our Pliocene precursor. His sight was no doubt keen, and perhaps equal to that of Bushmen and Australians. But in powers of sight man is one of the most gifted of animals. Even to-day the eyesight of those Europeans who have trained themselves to hunt big game is not inferior to that of many savages. It is probably not as good as that of real hunting races such as the Hottentot Bushman, said by Fritsch to have "maximal sehschärfe."[30] As regards hearing, it is interesting to note that lemurs are sometimes exceedingly noisy. The Indris howls like a dog. Others are specially lively in the evening, uttering loud cries, or growling like a dog if an intruder approaches. As soon as the Pliocene precursor began to form a language, he would no doubt begin with a few shrieks, croons, wails, growls, and roars. There is no reason to suppose that he was less gifted than the domestic hen, which has a vocabulary of twenty sounds. It is impossible for us to realize how exactly he developed a language. Children begin to speak in an "interjectional" manner, and are very anxious to learn new words.

Krause, who was born deaf and dumb, said that those so afflicted imitate in thought the shape of objects with

their hands, so fixing it in the mind and recalling it to the memory. By signs of this kind a gesture language with appropriate interjections would arise naturally, and "a way for thought is already broken."[31]

The mental exercise involved in language-making must have further developed his intelligence.

As regards other senses, in that of smell man is grossly inferior to most animals, and in this respect is degenerate. The gradual hand and eye training inseparable from the use of tools and the manufacture of tools would also react on the brain, leading to further development both of eyesight and of tactfulness (see p. 112). All these influences, increasing watchfulness, language-forming, the making and using of tools, may perhaps be thought of as influencing the expansion and development of the brain. It is the brain that seems in some mysterious way to govern the growth and expansion of the skull-case (see p. 73). Then at a certain critical stage came the parting of the ways. On the one side the chimpanzee preferred huge canine teeth, a four-footed or arboreal life, and the possibility of a large stomach. On the other, the erect attitude, the extra development of the brain, even with restriction in appetite, appealed to that Pliocene precursor who became the ancestor of man.

Now (it was not possible twenty-five years ago) most anthropologists recognize that a strictly scientific treatment must not omit reference to those moral and spiritual instincts which are beyond and above, though inextricably connected with, the brain. It seems to us that especially at this critical period the Pliocene precursor must have been exceedingly inquisitive. He was more or less in safety so long as he remained an arboreal animal; but when he left the trees or only resorted to them for safety and shelter at night, this involved all sorts of moral qualities. He had to be excessively wary, and yet bold and courageous; enterprising, and yet patient; the maintenance of his young must have required of

him very hard work and an extraordinary amount of affection.

All these qualities involve an unusual character. The moral quality of the Pliocene ancestor was surely beyond that of the best of the animals, even though these do possess embryonic states of both virtues and vices. It will be seen, therefore, that at the critical moment, three lines of development happened to coincide. For a whole geological period, perhaps, the power of standing, of running, of using hands and fingers had been slowly perfected, involving, as we tried to show, a thorough-going modification in the ground-plan of the body. At the same time, increase of brain had been accompanied by a development of intelligence; eye, ears, finger and thumb were being more and more directly controlled by the mind. Then, also, frequent crises required of the male heroism and self-sacrifice, and of the mother incessant daily devotion.

But at some particular moment the accumulated knowledge that he had gathered of all the evil things in a very dangerous world, and his power of enjoyment of what was good in it, suddenly changed into a knowledge of Good and Evil. The change was not more sudden than the first stroke of a complicated piece of machinery set going for the first time, nor of the first abrupt explosion of a volcano which has been extinct for centuries. But so far as man was concerned, it transformed everything; from being one of the other animals, he became *in posse* master of all.

Did this change occur in several places more or less about the same time? It was not necessary that the three lines of growth—that is, in body, in brain, and in moral sense—should have proceeded together. It is seldom that a high level in all three directions occurs in any race of mankind. Moreover, there are four genera of anthropoid apes very close to man in bodily structure, but otherwise hardly above the average animal.

The coincidence of these three ascents in evolution was

a very remarkable event. Moreover, the climate must have been congenial and food abundant, or an infantile race could hardly have managed to live. But such places involve competitors, and especially carnivora, which should have been dangerous enough to keep early man strenuous and virile, and yet not sufficiently abundant so as to exterminate him (see p. 27). That is to say, the habitat was in the highest degree an unusual one. It seems, then, that these three evolutions and a suitable habitat could hardly have coincided more than once and in one spot, and in this sense we believe in a single ancestor, or are *monogenists*. But as soon as the first step had been taken, man would increase and multiply, and, in all probability, wander over the whole earth. For many thousand years he could hardly be more than a mere lonely hunter such as the Fuegian or the Tasmanian, the Bushman or the Veddah. With other animals such as the horse, elephant, and deer, the first-known representative is usually followed in the next geological epoch by a number of species. We find in the Pleistocene, which follows the Pliocene, not one, but, at any rate, three forms of man, and we are justified, as we hope to show, in suspecting others. So though there was an original primitive *souche*, we expect to find a specialized primitive race in every marked climate-region of the earth. Therefore it seems necessary to call ourselves *polygenists*.

In this book, as we have explained, we are concerned solely with the story of mankind so far as it can be honestly read by the study of Nature.

Now, although we have admitted that all animals may possess germs of mentality and morality, it will be seen that for this sudden change in man's nature and status no real explanation has been offered.

In the oldest and most widely read of all books an answer can be found to satisfy those difficulties which arise from the present condition of science and of man himself, but a discussion of the great questions involved would be, in this work, incorrect and perhaps impertinent.

Estimates of capacity and weight of brain are unusually conflicting. Professor Keith, gives 1,450 c.c. as that of the Piltdown skull; M. Boule gives, for the La Chapelle aux Saintes skull, 1,620 c.c.; for Neanderthal, 1,408 c.c.; La Quina, 1,367 c.c.; Gibraltar, 1,296 c.c.—*Nature*, August 28, 1913.

[1] See Holmes, *Evolution of Animal Intelligence.*
[2] *Ibid.*
[3] Gormaz, *Scots Geog. Mag.*, January, 1902.
[4] Coquerel, see Daniel Giraud Elliot, *loc. cit.*
[5] Holmes, *loc. cit.*
[6] Given on the authority of Frederici, *Arch. f. Anthrop.*, 1908-09.
[7] Hartmann, *Anthropoid Apes.*
[8] Wallace, *Malay Archipelago.*
[9] Daniel Giraud Elliot, *loc. cit.*
[10] Holmes, *loc. cit.* [11] *Ibid.*
[12] Hon. H. Sandwith, see Daniel Giraud Elliot, *loc. cit.*
[13] *Ibid.*
[14] Von Koppenfels and Müller, see Hartmann, *loc. cit.*
[15] This has sometimes been attempted. Heysman u. Wiersmap tried to find out if sexual selection applied to moral qualities. The following classifications were used by them: (1) Viel lachen. (2) wenig lachen, (3) nie lachen, (4) um eigene Witze; (1) Gedehnt u. schleppend, (2) Schreiend, (3) Gleichmassig dahinfleissend, (4) Kurz Arbeizzend.
[16] See Buschan, *Arch. f. Anthrop. Korr. Blatt.*, 1904; Ferreira, *L'Anthropologie*, 1904; Robertson, Proc. Roy. Soc. Edin., vol. xxxi.; Beddoes, *L'Anthropologie*, 1903.
[17] Proc. Roy. Soc. Edin., vol. xxxi. Area in square millimetres of brain surface as under:

European ...	4,710	frontal	4,577	parietal	758	occipital
Australian ...	4,857	„	2,534	„	1,204	„
	−147		+2,043		−446	

[18] Buschan, *Arch. f. Anthrop. Korr. Blatt.*, 1904.
[19] Cunningham, Brit. Assoc. Reports, 1901.
[20] Bolk, *Zeit. f. Morph. u. Anat.*, 1912.
[21] It has been found that in negroes the sagittal suture (in the middle line of the skull above) is sometimes closed, whilst the basal suture remains open. The author had often been struck by the bright, quick intelligence of negro boys, which disappears suddenly as soon as the youth becomes mature. Now, for countless ages past, negro boys have been put to carrying loads on the top of the head at a very early age, and in my work, *Naturalist in Mid-Africa*, I ventured to suggest that this may have contributed to the sudden stop in the development of intelligence, which I think has been noticed by most who have had acquaintance with Bantus. So far as

one can follow the recent work of Bolk, there seems possible confirmation of the theory.

[22] *Arch. f. Morph. u. Anthrop.*, 1911.

[23] Toldt especially lays stress on this point. The broadening of the face affects the lower jaw, and especially forces the union of its two halves (*L'Anthropologie*, 1905).

[24] In some monkeys the two halves of the jawbone never unite at all (Macacus); in many monkeys union occurs only in the adult stage. It occurs in the preadult stage in gorilla, juvenile gibbon, infantile orang-utan, and before birth in chimpanzee and in man (Frizzi, *Arch. f. Anthrop.*, 1911; also Walkhoff, *Anatom. Anzeig.*, Band 24).

[25] *Arch. f. Anthrop.*, 1903, 1904.

[26] *Ibid.*, 1912.

[27] Verneau, *Les Anciens Patagons*. Monaco, 1903.

[28] According to photographs, this people seem to possess this feature (Miller, Eth. Survey. Publ., vol. ii., parts ii. and iii. Manilla, 1905). The Polynesians which showed this peculiarity were—Woodlark Island, 2; Easter Island, 1; Hawaii, 1; New Zealand, 8; Marquesas, 5; Tahiti, 4; Hervey Island, 1; Chatham Island, 1; Sandwich Island, 1 (see Sergi, *loc. cit.*).

[29] The reader is referred to Cope, Osborn, Duckworth, Gaudry, Bolk, and Adloff, for full details of the story of the teeth.

[30] Fritsch. His scale is as follows: (1) Hottentot bushman; (2) Indo-Chinese and Javanese; (3) Aborigines, British India (?); (4) Mongolian, Australian; (5) Berber, Nubian, and Bantu; (6) Red Indian; (7) European. It seems very difficult to obtain averages in such a character as this (*Arch. f. Anthrop.*, 1909).

[31] Tylor, *Prehistoric Man*.

CHAPTER V

THE FIRST HOME

IT seems probable that it was in North America that the very first primate originated. These interesting animals are found in the Lower Eocene deposits, which means that they are perhaps the most ancient of all known mammals. Near Paris, also, and in other parts of Europe, Eocene lemurs have been discovered. A little later in geological time two species were living in Egypt—that is, within reach of Somaliland—where there is now at least one living species. The great group of monkeys, in a sort of generalized form, also occur in the Eocene of North America, and at a later date in South America as well.

One of the South American apes enjoys the name of *Homunculus patagonicus*,[1] which would lead one to suppose that it approaches the human ancestor more closely than other fossil monkeys. But there does not seem at present any evidence for a special and particular resemblance to man in *Homunculus patagonicus*, nor, indeed, in any American fossil hitherto discovered. North America was, as we have seen, probably the birthplace of the first primate, but there is really no evidence that the New World was inhabited by man until after the Ice Ages.[2] It is true that Professor Sergi, perhaps the most eminent anthropologist of our own times, places the first home of mankind in South America, and thinks that the earliest migrations occurred via the Antarctic Continent to Australia, and thence through the South Sea Islands. New discoveries might, of course, prove his theory to be

correct. Certainly Antarctica was at one time a land of forests and of song-birds, of babbling brooks and well-grown forests; yet the evidence on which Sergi's argument rests has been practically obliterated by destructive criticism, and therefore it is in the Old World that we have to search for the first home of mankind.

In Miocene and part of Pliocene Europe, the climate was warm and genial, with a luxuriant vegetation. Many monkeys and anthropoid apes inhabited the forests. Unfortunately, although these animals do certainly fulfil our expectations in being more or less transitional or ancestral, and in this way allow of endless discussion as to which was the ancestor of the modern man-like ape, yet the bones and teeth of any one of the fossil Miocene species are so few and so very transitional that it is in the highest degree difficult to draw any definite conclusion from the inextricable tangle of conflicting opinions. There are at least three which might have been our distant ancestors, and this is an important point in view of the fact that Miocene eoliths have been discovered (see p. 29).

The molar teeth of *Gryphopithecus Suessi* (called also *Dryopithecus*) are said by Thevenin to be so nearly human in appearance that they could be so described. But it was ape-like in the length and narrowness of the jaw, in its strong canines, and in the form of the chin. This animal lived during the Miocene period at Neudorf-sur-la-Morava, in Hungary.[3] Two others had teeth very like those of primitive man—viz., *Anthropodus Brancoi* of the "Bohnerz" of South Germany and the Indian *Anthropopithecus siwalensis*, which is closely allied to the modern chimpanzee, but has more human-looking teeth than the present-day type of that species.[4]

Besides these, *Pliopithecus antiquus* wandered from the Pyrenees to Styria, and is supposed by some to be the ancestor of the gibbons. Greece had its *Mesopithecus Pentelici*, which was intermediate between certain living families of monkeys.[5] Tuscany possessed *Oreopith-*

ecus Bambolii also with affinities between modern families. In Germany *Pliohylobates eppelsheimensis* wandered about Darmstadt, and is also said to be an ancestor of the gibbons. Near St. Gaudens, France, also in the Miocene, *Dryopithecus fontani* seems to have been common, and from this species not only the gibbon, but the orang-utan, and also the gorilla, are said to have descended. Naturally, we do not mean to imply that either man or any of the living anthropoid apes were descended severally from more than one of these Miocene precursors. But it is quite satisfactory to know that we have a choice, that there are at least six or seven possible ancestors which are known to have lived in the Miocene period.

According to an interesting essay by Macnamara, even at and before the beginning of the Miocene period, certain apes had no less than 170 structural characters in common with man; the giant apes of the Early Miocene had 150 of these common characters, which increased to over 300 in the Mid-Miocene chimpanzee-like form. In the Upper Miocene, in his view, man became a plantigrade animal.[6]

The range of the closely allied man-like apes at this early period seems to have included all southern continental Europe, and probably the Siwalik Hills in India. So far as one can judge, the climate was everywhere warm and genial, neither strictly temperate nor strictly tropical. None of them, so far as we know, crossed the Sahara, or the great Asiatic desert which extends through Arabia, Persia, and Beluchistan to the frontiers of India; the Siwalik Hills are north of the Indian desert.[7] The present-day distribution of the lemurs, of the living anthropoid apes, and of the pygmy races of man, shows a very interesting and remarkable contrast.

They are all to the south of the great African-Asian desert; in India only to the south of the Indian desert; but they occur in Indo-Malaya and in the great oceanic islands. In the exquisite monograph of Dr. Daniel

Giraud Elliot, the distribution of the lemurs is very carefully described. The family is mainly centred in Madagascar, which they had reached during our European Ice Age. They occur as far north as Harrar in Somaliland; they are found in the Congo basin, and in West Africa to Sierra Leone and Old Calabar. There is also a species in Natal and Zululand. In Asia they inhabit the Philippine Islands, Java, Sumatra, Annam, Siam, South India, and Ceylon.

Of the anthropoid apes, the orang-utan (pongo) is only found in Borneo and Sumatra. All the thirteen species of gibbon live in the Indo-Chinese and Indo-Malayan regions. Both the gorilla, its near ally pseudogorilla, and the chimpanzee (Pan) are entirely African, and all the species except two are found either in the West African or in the Congo forests. The exceptions are one chimpanzee in the Niam Niam country, and one gorilla in German East Africa.[8] The pygmy races of man occur in the Congo forest, East and South Africa, Andaman Islands, Southern India (probably), Ceylon, Malay Peninsula, New Guinea, Philippine Islands, and possibly in Madagascar[9] (see p. 188). All these three groups, therefore—lemurs, anthropoid apes, and pygmies—occur *in the same part of the world*—that is, in Africa south of the Sahara, India south of the Indian desert, and Malaya, and in the larger oceanic islands as far as the Philippines. But in Mio-Pliocene times they had only reached the *northern edge* of the Sahara-Asiatic desert (if so far), and the Siwalik Hills in North India.

This is a very curious point which, so far as the writer is aware, has not as yet been noticed. Moreover, the anthropoid apes fall naturally into two groups—the African and Asian; so also do the pygmies, for the African, and especially the Bushmen, are often separated from the Asiatic. If we exclude the Madagascar lemurs, the rest of this last family also divides into an African group and the Asiatic. The lemurs were surely the earliest in time

of all the primates, and presumably the first to migrate. We have seen that a possible ancestor of man inhabited Miocene Europe and North India along with the ancestors of the lemurs and apes. The pygmies—the least modified and most primitive, or "infantile," of all races—as well as modern lemurs and apes, all live south of the desert or in South India. The only exceptions are those pygmies who entered Europe in the Ice Ages, and came from North (*i.e.*, north of the desert) Africa.

FIG. 4.—TWO BAROTSE FIRE-DRILLING, SOUTH CENTRAL AFRICA. (FROM A PHOTOGRAPH.)
(Frobenius, *Childhood of Man.*)

Almost all these animals and men are tropical jungle forms confined to trees, and it is only a few exceptional species that have managed to adapt themselves to subtropical or temperate conditions. It follows surely that there must have been at one time a semitropical forest connecting the African jungle and the Southern Indian and Malayan forests with the similar luxuriant tree-growth of Greece, Italy, and Europe; but this forest

would be Late Pliocene, filling the interval, or part of it, between the Early Pliocene woods of Europe and the Ice Ages.

From the frontiers of India to the West Coast of Africa there extends to-day a great desert, which seems to be, geologically speaking, recent. None of these animals could possibly cross this arid country in our own days.

Yet all the probability from the facts of distribution seems to point to a great Pliocene migration across the desert. Somewhere *en route* both lemurs and anthropoid apes divided into an African party going south-west and an Indo-Malayan group wandering south-east. The pygmy ancestors followed the same route, also dividing into two—the African and the Asiatic subdivisions. Perhaps the history of the cinnamon-tree brings out this probable migration even more clearly. They, like the Primate ancestor, lived in North America during the Eocene. They flourished abundantly in Europe from the Baltic to the Pyrenees, both in Britain and in Southern Italy, during the Miocene. Now, though rare, they still exist in Ceylon along with the lemur and the Vedda, and also in Indo-Malaya. The cinnamon climate to-day is very much that of Miocene Europe, so that they surely crossed the desert also. But between the Middle Pliocene and Mid-Pleistocene—that is, halfway through the Ice Ages—there was a wet and humid climate in Northern Egypt and Palestine.

Three great fresh-water lakes existed on the present lower courses of the Orontes, Nile, and Jordan. The Dead Sea is the existing remnant of the last mentioned, but its waters were then about 456 metres (1,300 feet) above the present level of its contracted representative.[10]

In that latitude the climate must have been warm as well as wet, and a luxuriant forest would surely have thriven along their shores. Let us suppose that one of

the Pliocene man-like apes (perhaps Pithecanthropus) lived in a semitropical forest in this district — that is, between the Mediterranean on the east, the Indian frontier on the west, the Black Sea and Caspian Sea on the north, and the Indian Ocean on the south, and in the first half of the Pliocene period.[11] Let us also suppose that he became man before the end of the Pliocene. One set of his descendants left for India and the great oceanic islands, following the route of the Asiatic lemurs, the orang-utan, and the gibbon. Another set went to Africa by the south-west, becoming in course of time the African pygmy, and also following the track of other lemurs and of the gorilla-chimpanzee ancestor. In another chapter we try to show that both these routes are regular highroads of migration quite clearly marked in later historic, as well as prehistoric, ages. Indeed, the area sketched roughly above unites Europe, Africa, and Asia, and it is to this area that all the main routes of migration, when followed backwards, seem to lead. Our Pliocene Mesopotamian we will suppose, judging from the anatomical evidence, lived for the most part in trees. What did he live upon? We have already given some details (see p. 91) regarding the food of lemurs, of the anthropoid apes, and of the present-day forest pygmies, all of which is apparently, and, of course, in a general way, very much alike. Fruits of all kinds (nuts and fleshy fruits), small birds and eggs, honey, grubs, and insects are the main articles of diet for them, and in all probability the Pliocene ancestor originally lived in very much the same way. He may, of course, have eaten shellfish, and especially oysters; West African monkeys are still fond of them, and for many primitive peoples shellfish are of the first importance. When the change was beginning, there are two conditions which seem, at least to the writer, to be fairly deduced from the considerations set forth in previous chapters.

First, that in the early stages of alteration, there must have been a fairly congenial climate and an abundance of the food to which he was accustomed. Secondly, that some strong inducement existed which forced him to leave the trees and to walk on his hind-legs, not only occasionally like the chimpanzee, but regularly and habitually. What is the climate to-day of this area—the meeting-place of three continents, and the birthplace of religions? It lies between the isotherms of 18° and 21° C. or 65° and 70° F. This is the climate of Sicily, part of Greece, Madeira, Charleston, New Orleans, and Honolulu. It is the very best of all the climates in the world that could be chosen for an infantile race. It lies *between* the regular tropical, with wet, steaming, impassable jungles, and the colder temperate zone, so affording chances of acclimatization in both directions.

Everywhere in the Mediterranean this particular climatic belt has been for so long inhabited that its natural vegetation has been completely altered, if not entirely rooted out, and grazed away. So that it is very difficult indeed to picture for oneself the middle Pliocene vegetation of Syria, Arabia, and Persia. But it is clear from geological history that the climate changed; it was humid and warm before the earth movements and general disturbances of the later Pliocene, and it is to-day, in most places, dry and arid—an unmitigated desert. During early historic times the process of drying up or "the desiccation of Asia" can certainly be traced, and according to some authorities it still continues. Could one imagine any conditions that would fit in better with the evolution of man? He had to leave the trees because the forest was leaving him. At first it would break into scattered woodland, clinging to moist situations, such as the banks of rivers, deep and narrow valleys, or mountain-sides. Then these would further diminish to mere patches of scrub and little groves, in the best-watered situations, in ravines and kloofs, such as

one finds in South Africa—as, *e.g.*, the Boschberg, near Somerset East.

Judging from the transitional stages at work to-day in various parts of Africa, the steps might be as follows: First semitropical or warm temperate woodland like the Knysna forest or Perie bush, then less vigorous woods, breaking now into park-like scenery or into a scrub, hardly forest, of scattered trees. Then the inevitable Acacia would replace almost all other trees. This would change into stretches of dry steppe grasses, an open flora, with an abundance of lovely flowering bulbs and small, gloriously coloured ephemeral flowers springing up after rare showers of rain. But there would still be thickets or scrub in specially favoured places near permanent water and about the springs, for one must remember that the forests of Cupressus, in Asia Minor, and of Cedar in Lebanon, persisted until well into the Historic period. Yet at a very early geological period the vegetation would become quite unsuited to an arboreal animal. The plants which formed these thickets, and the animals which haunted them, were, of course, factors of the environment which must have profoundly modified the evolution of the earliest man.

The Flora Orientalis which now inhabits this area is one of the richest and perhaps the most beautiful in the world. No one who has not seen the limestone hillocks of Mariout and Ramleh, or the Ægean Islands, or perhaps Palestine in the right season, can realize the exquisite colouring and extraordinary variety of lilies and amaryllids, iris and anemone, scarlet poppies and rich red ranunculus, purple albuca, golden-yellow composites and Leguminosæ. This flora, the rarest of memories to any enthusiastic botanist, is, however, only the remains and the miserable relict of that which was known to the Pliocene precursor. The aridity of the climate, and the ravages of the goat, the camel, and the ass, have left only a small part of the natural flora. We know, however, that in these thickets

were growing the original forms of peaches and apricots, of figs, vine, medlar, almond, oranges and lemons, apples and pears, the mulberry and the pomegranate. Beans and lentils, the great onion family, not to speak of *Triticum monococcum* (L.), *Hordeum spontaneum* (C. Koch), *Secale montanum* (Guss), and other ancestors of our vegetables, grew either in the grassy plain, or amongst the bushes, or on rocky hillsides.

As to the woods, or what was left of them, we have not space unfortunately to give in full Willkomm's beautiful description of the original forest in Spain.

But one may perhaps imagine riversides bordered by giant alders, celtis, and willows, and full of fragrant laurel and *Rhododendron ponticum*, with also phillyreas, laburnum, strawberry-trees, and perhaps lilac. Through this may have wandered our Pliocene ancestor, occasionally ascending into the foothills, where no doubt there were oaks of several kinds, edible chestnut, wild olive, with dark green cushions of mossy liverwort on their trunks and on their branches, grey or reddish-yellow festoons of Usnea, and other lichens.[12] But if he did so, he must have been for ever wary and watchful, for there were noisome beasts of the most dangerous character. Certainly lions, bears, and wolves inhabited the country. It is probable that there were also (towards the end of his evolution) sabre-toothed tigers, hyænas, elephants, rhinoceros, wild boar, hippotamus, bison, and buffalo, the last probably the most dangerous of them all.[13]

There would therefore be no lack of the Stimulus of Evil to keep him alert and to prevent his drifting back into the fruit-eating, arboreal-acrobat existence of the gorilla and orang-utan. In fact, if one supposes that somewhere in the Mesopotamian region, or, rather, in the great quadrilateral which we have described above, a Pliocene animal very like Pithecanthropus was isolated by the gradual disappearance of the forest, every condition which one requires for his transformation seems, so far as we can

see, to be exactly fulfilled. When we first find the remains of European man in the Ice Ages, it is with machairodus, elephant, rhinoceros and hippopotamus. Later on we hope to show that the earliest forms of mankind can be traced back to the same locality; and not only they, but their domestic animals seem to belong to it.

There were, however, not one but several races in Europe before the Ice Ages had definitely passed away.

It is interesting to see if any light has been thrown by recent research on the causes which produced variation in these, the earliest type of man, and so which may have led to their formation. The simplest variable quantity is the average height of the race; with this should always be considered the proportions of the body (see p. 50). A plentiful supply of good food seems to increase the average stature of a people without altering the other proportions. The better or, at any rate, richer classes of Paris, England, and Belgium, and the royal families in Polynesia are taller than the average population. So also in the South Seas, the natives of fruitful volcanic islands are the tallest.[14]

It is also said that limestone districts or lime in drinking-water tends to increase the average stature. On the other hand, those who have lived in cities for two or three generations seem to become shorter at least on the average.[15] Early marriage is also said to bring about a lowering of the mean stature of a population. The shortest of all Europeans are certain Polish Jews who only average 1,612 millimetres, and who marry at fourteen to fifteen years of age. The Japanese, who are distinctly shorter than other yellow races, marry at eleven to twelve years of age.

One at least of these supposed influences is clearly supported by what has been observed in the case of animals. Unfavourable conditions such as bad food or exposure to a northern climate leads to dwarfing—as, *e.g.*, the dwarf cows of Kerry, Norway, and of some hill states in India,

the pygmy hippopotamus of Malta and Sicily, and the Shetland pony. Dwarfing also results when plants are grown with insufficient nourishment or under conditions of extreme exposure. It is probable that the pygmy is the earliest or near the earliest of races. The three tall races of Glacial and Post-Glacial times should therefore have enjoyed better food than the pygmy, who even to-day is often starved, and suffers from indigestion. It is, however, impossible to prove that the Neanderthal and Cromagnon man, or the earliest of the Alpine race, lived more generously than the modern Bushman. Another very early folk (though later in Europe than the others)—namely, the Mediterranean race—is also short. They, from the very beginning of their known history, seem to have preferred a social life, and usually selected rich alluvial soil, which is often deficient in limestone. The most one can say from the evidence so far is that the strenuous conditions of life in and after the Ice Ages did somehow increase the stature of the three tall races, but there is no evidence to show that they usually married late and had plenty to eat.

The next character is one regarded as being the most distinctive of race—namely, colour of skin, to which may be added colour of eyes and of hair. The immense majority of the races of mankind have more or less dark eyes and hair. Dark skin is perhaps also more prevalent than any other colour. So that the real point is to know how or why it was that the skin became white or yellow, the eyes blue, and the hair golden. It is said that the cells of the human skin (epidermal) can produce pigment, and that the influence of light favours the formation of dark pigment. White skin, blue eyes, and blonde hair, distinguish especially the great Teutonic people. They are first heard of in North Germany and Scandinavia, a part of the world which is only favoured with 1,250 to 1,500 hours of sunshine in the year. We suspect that the Teutonic race is in part descended from the men

of Neanderthal, who seem to have enjoyed some 40,000 years of a climate with certainly not more sunshine, so that in their case the production of dark pigment was not favoured by light.

But it has been pointed out that both the Lapp and the Eskimo are dark, and that some tropical American tribes are light skinned.[16] At first sight this seems to destroy the whole argument.

But in reality, these exceptions rather prove the rule. Both Eskimo and Lapp live near or beyond the Arctic Circle, and are therefore for half the year exposed to *nearly continuous sunlight.* In tropical forests also, it is not the case that people are exposed to stronger and more continuous sunlight than those who live in the warm temperate zone. On the contrary, of all places in the world, the dense jungle of the Congo and of West Africa is perhaps the most dark and gloomy of human dwelling-places.

We must refer to later chapters for the little that is known of the other first Europeans, but the great Eastern branch of the Mongolian family, to which Chinese and Japanese belong, are *yellow-skinned.* This tint is very peculiar, at least to European eyes; it reminds us of the characteristic American as compared with the English complexion.[17] Even in London there is a tendency toward this colour which may be more politely described as "old ivory," and which is by no means unbecoming. We are in the habit of supposing that the close stove-heated rooms in the United States tend to favour this tint. It is perhaps worth mentioning that the yellow-skinned Mongols seemed to have wandered to Manchuria by the Siberian route, and that some of those still living in northern districts do still sleep the winter through *on the top* of a very primitive stove. But there is no scientific warrant for the effect of a close atmosphere on the skin, and not enough is known of the early history of the Mongolians to warrant any general statement. The

earliest shortheaded people in Europe were probably dark-skinned like the Lapps.

That there is a strong hereditary influence in the human species cannot be denied. Even abnormalities are transmitted. "Short fingers" or (minor brachydactyly which is due to premature ossification of the gristle in the finger) was found to be inherited by 44·6 per cent. of the children.[18] Such peculiarities as a six-fingered hand, colour-blindness, deaf-muteness, tendency to cataract, and other diseases well-known to medical men, are undoubtedly transmitted by heredity.[19] We shall mention one case which is of real interest for the peculiarity, an exceedingly small size of head has been traced both to the son and grandson. The circumference of the grandfather's head was 515 mm., that of the father 492 mm., and that of the son 325 mm., and the cephalic indices were 90·85, 92·30, and 97 respectively. Another character of the same family, an enormous nose strongly curved downwards, was also transmitted.[20] At first it would seem as if such evidence is "of very small value," but all these characters depend on some alteration of either the tissues or of the order of their development.

Of late years the views of Buckle have been treated with contumely. Nevertheless certain of his deductions are historically true. Temperate and cold temperate races are certainly on the whole more energetic and dominant than those of warm temperate and tropical climates. This seems to be the result of selection of a virile, vigorous type through the severity of climatic and other conditions. In the selected ones, the tissues are all full of vigour, and harmonize in development. Virility is inherited just as surely as any weakness in the tissue or a premature ossification. According to Hocepied, the northerner inevitably become the superman "à peu près comme dans un tube d'eau se superpose mercure et l'huile á l'eau."[21] Now, if one takes a typical northern race such as the Danes of Schleswig-Holstein with 82 per cent. of

the male population fair-haired,[22] and remembering that it has been exposed to the rigours of a Baltic climate for probably 20,000 years, then farming, hunting, and raiding by land and sea, would have made up the experience of this people until within the last 200 years. Contrast with this the Mediterranean race, with probably 10,000 years of village or city life, with its intensive agriculture, and its experience of all sorts of barbarous conquerors and despots. Is it at all extraordinary that one race shows vigour, a certain brutality, energy, courage, and total want of sympathy, and that the other is clever, disciplined, patient, sympathetic, and has those artistic and religious instincts which have revolutionized the world?

Even in their respectives liabilities to various diseases, it has been shown that blondes in London differ from brunettes. The former suffer very severely from infectious disorders, such as are common in crowded centres, up to fifteen years of age, but are less subject to consumption. The brunettes are less affected by the infectious illnesses of childhood, but from twenty to twenty-five lose severely from consumption.[23] If the blondes are mainly Northerners and the brunettes for the most part of Mediterranean race, then these differences seem precisely what one would expect from the life-experience of both these races. One might even suggest that the reason of the gradually increasing percentage of brunettes in British cities and towns is simply that the blonde Northerner dislikes and is not acclimatized to those city conditions which are in every way congenial to the sociable Mediterranean.

In this, as, indeed, in all cases, the factors that have influenced the evolution of a race are not merely climatic; they are mixed up inextricably with social and other influences which are possibly of more importance. If it may be supposed that the original type of man was short, dark-skinned, short headed, with overlong arms and a very broad flat nose with nostril openings much exposed,

then we have seen that changes in the proportions of the body, an increase in height, and a white or yellow skin, are not of altogether mysterious origin. The shape of the head seems to be connected with the length and size of the jaw, and it is possible that the Neanderthaloid and Australian type, or, perhaps, long-headedness in general, is only a temporary diversion due to special conditions of a primitive brachycephalic type.[24]

At present no light seems to have been thrown on the evolution of the nose. In a new-born infant there is (we fear) a distinct resemblance to the short, broad, snub, with its wide nostrils, of the negritto. The aquiline nose is characteristic of the Jewish race, of many Australians, and certain Indians who live in the high plateaux of Peru; but there has been, so far as the author is aware, no attempt to explain it as a modification due to atmospheric conditions. (See, however, p. 269.)

But though the effect of environment on the evolution of race-characters seems to offer a promising field for research, intermixture of race seems to have been of most help in the progress of man. According to Driessman, no people without a trace of foreign blood can ever institute a culture. This is, of course, undeniable, in view of the fact that one can hardly mention a single living people which is anthropologically a pure race.[25] Nor is the bringing in of a new physical type the only question. Good languages with all their effect on the intelligence are invariably borrowed, and along with words and phrases, customs, inventions, and weapons are introduced. In fact, the physical origin of modern progressive nations seems to resemble very closely that of the best breeds of domestic animals. Climate has its effect; there is always a stringent selection, and an occasional introduction of fresh and hardy blood proves invigorating. But one must not forget an esssential difference, for it is mental and moral qualities that insure the survival or the dominance of nations.

[1] Dr. Ameghino discovered and christened this form, believing in its ancestral character.

[2] Sergi places the first man in South America (*Arch. f. Anthrop.*, 1912).

[3] Thevenin, *L'Anthropologie*, 1904.

[4] Kollmann, *Arch. f. Anthrop.*, 1906.

[5] Cercopithecus and Semnopithecus.

[6] *Arch. f. Anthrop.*, Neue Folg., Bd. 3, 1905. At the present day, according to Keith, man has 396 characters in common with the chimpanzee, 385 with the gorilla, 272 with the orang-utan, and 188 with the gibbon. *Cf.* Schwalbe, *L'Anthropologie*, 1906.

[7] The Siwalik fauna occurs in the Punjaub, Sind, Perim Island, and in Malaya, Java, and even as far north-east as Shanghai (see Lyddeker, *Geog. Dict. of Mammals*, 1896).

[8] *Cf.* Daniel Giraud Elliot, *loc. cit.*

[9] Hagen, *loc. cit.*, states remains of pygmies are traceable in the primitive Indian of South America (see Chapter XI.).

[10] Blanckenhorn and Laloy, *L'Anthropologie*, 1905, p. 670.

[11] A Moustierian tribe did inhabit the Lebanon in the Pleistocene period.

[12] Willkomm, Engler, and Drude, *Veg. d. Erde, Iberischen Halbinsel*, 1896.

[13] These all occur in the Pliocene of North-Western India, and all, except machairodus and the bison, still live in Africa. In Palestine (Mousterian) woolly rhinoceros, bison, *Bos primigenius*, bear, and felis existed (Blanckenhorn, *L'Anthropologie*, 1906).

[14] Revetz, *Arch. f. Anthrop.*, 1905-06 ; Schwerz, *ibid.*, 1911. Ewart found eight rabbits in one uterus, and four rabbits in another. Thc former were just half the size of the latter (Trans. Roy. Soc. Dublin, 1902).

[15] Beddoes, *Stature and Bulk of Man*, 1867.

[16] Schwalbe, *L'Anthropologie*, 1905.

[17] *Cf.* Ripley, *Jour. Roy. Anthrop. Inst.*, 1908.

[18] Drinkwater, *Journal of Genetics*, 1912.

[19] Sir William Turner, British Association, 1899 ; also Correns, who mentions hæmophily, "grauen star," night blindness, Gower's sickness, the Hapsburg under-lip, etc.

[20] Houzé, *L'Anthropologie*, 1904.

[21] Hocepied, *L'Anthropologie*, 1904.

[22] *Cf.* Gray, *Jour. Roy. Anthrop. Inst.*, 1907.

[23] Shrubsall, Brit. Assoc. Rep., 1904, p. 702.

[24] Unfortunately we cannot conscientiously accept the ingenious suggestion of Dr. Walcker, who states, as a result of experiment with twin infants, that lying on the back or on soft pillows tends towards brachycephaly, whilst lying on the side or on hard pillows tends to produce dolichocephaly (*L'Anthropologie*, 1906, p. 209).

[25] Driessman, *Rassen u. Milieu*, Berlin, 1902. Supposing that a black skin is characterized in the Mendelian sense by ten pairs of characters, then, if a white European and a negro were crossed, a pure white or black skin would only be found in one case per million (Correns, *Die Neuen Vererbungs.* Jena, 1912).

CHAPTER VI

THE ORIGIN OF FIRE AND THE USE OF TOOLS

In such a country and under the conditions supposed in the last chapter, if there was any natural source of fire, the effects would be very serious. With a diminishing rainfall and occasional fires, the forest of the plains and plateaux would become scarce and almost disappear. Woods would no doubt remain along riversides and near lakes and marshy ground. In British East Africa we have ourselves observed that a vigorous grass-fire was unable to catch hold of the usual riverside or gallery wood, so that the forest might not vanish altogether.

But how were these grass and forest fires produced? A flash of lightning or a lava flow may possibly have started a conflagration. Yet this cannot have been a common origin of fire, for the lightning is usually followed by heavy rain, and the molten lava, besides being rare and local, would be accompanied with heavy falls of dust and ashes. Such fires would be surely very unusual, and we doubt if the ancestor could have obtained much knowledge of fire from either volcanic eruptions or thunderstorms. He would also almost certainly fly in terror from volcanic eruptions, and probably cower in the thickest bush that he could find during a thunderstorm. His nerves would certainly not be steady enough for him to experiment with fire under these conditions. Yet if there were grass-fires, it is more than likely that he would follow them, for he would appreciate grilled grasshoppers and other dainties.

How then did he learn to make fire?

There is one observation of a more or less definite charac-

ter which seems to give some hope of a satisfactory solution. According to Mr. Theobald, forests at Animallai in Southern India are often set on fire by friction caused by one bamboo branch rubbing against another.[1] In the sort of climate which we have suggested for the first home of mankind, there would be bamboos. It is quite likely that the earliest man would frequent the places where they grew in order to gather the young shoots, which are good to eat. He may have observed the smoke, and experimented with bamboos. It is also the fact

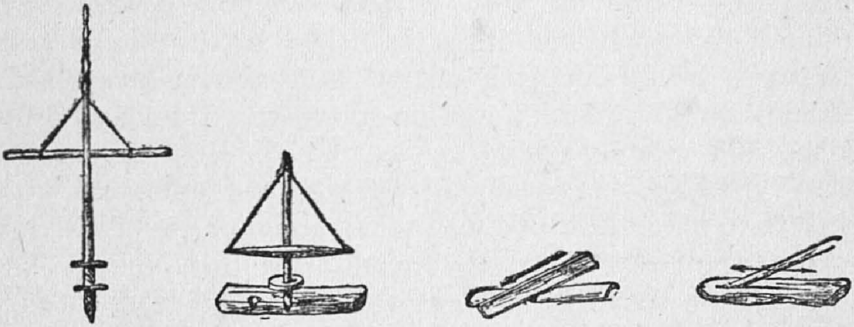


FIG. 5.—METHODS OF LIGHTING A FIRE.

A, Drill-borer, British New Guinea.
B, Fire implement, West Malaysia (after Pleyte). Pump-borer.
C, Bamboo fire implement, Malaysia (after Mason).
D, Implement for making fire by friction, Polynesia. The same form occurs on the Congo. This is the "stick and groove" process.

(Frobenius, *Childhood of Man*.)

that the negrittoes of Zambales still make fires by rubbing one bamboo across a nick in another. From this, if it was the original method, other ways of getting fire by friction might have arisen by experiment with other kinds of wood when bamboos were infrequent. This, at any rate, seems to be by far the most probable origin of fire.

The importance of this discovery to the earliest of men can hardly be exaggerated. In the first place he could now definitely leave the trees and sleep in security at his camp-fire, or perhaps in a cave with branches burning at

the entrance. A sharp fire-hardened stick is an efficient spear. With fire also, cooking and all its important influences began to influence his development, separating him still further from the brute creation. The various ways in which fire may be made have been described fully in Mason's interesting book, and it is unnecessary for us to go into details.[2] Another pygmy race, the Tapiro of New Guinea, use a split stick and rattan fibre. This is very similar to the "ploughing" method when one stick is rubbed up and down a groove in another.

But of all forms of wood-friction fire, the fire-drill is by far the most important. In very simple cases, such as that of certain East African tribes, the stick, held vertically, is twirled between the palms of the hand, and, being fixed in a slight nick or groove of the second piece of wood, soon sets light to the timber. In more advanced types a string is tied round the twirling stick; this is rapidly pulled back and forwards by two people. Still more efficient is the bowstring twirler, in which a bowstring is used instead of that in the previous case; one person can then work the arrangement, which in the best examples is neatly manufactured and unfailing in its effect. But before this last refinement in the apparatus had been invented, there had been certain remarkable developments. If one tries to place oneself in the conditions of primitive savage life, it is obvious that it was very foolish to allow the fire to go out. To relight it was a laborious and tedious business, and, indeed, in certain conditions of weather almost an impossible task. Hence, no doubt, it was the duty of someone to watch over the fire. When human society had risen to a certain stage of co-operation, the person entrusted with this duty would probably be an old woman.

We have no means of telling when it was that the fire itself began to be worshipped. There must, of course, have been from the very beginning a certain mystery about this strange phenomenon. These vague feelings would, as soon as the society became more or less controlled by a

medicine man, or shaman, be inevitably improved into a definite system, with vestal virgins and ritual observances. If the sacred fire went out, it would be in early savage times an intolerable nuisance, but later it would turn into a dire national omen, threatening all sorts of calamities. The method of relighting by means of the fire-drill developed into a sacred annual ceremony, overlaid, of course, with many strange rites and customs. The symbol for the fire-drill, devised at some very early date, and called the "svastika," became a mystical or cabalistic sign, and was regarded with superstitious awe.

FIG. 6.—FIRE-DRILLER, SOUTH-EAST AUSTRALIA.
(Frobenius, *Childhood of Man.*)

These details are given here because the distribution of these sentiments and the rites regarding fire is of the greatest possible interest. Thus in Ireland and Great Britain as well as in Brittany, the Beltane fires, which were newly lighted on a certain date every year, proved a serious difficulty to St. Patrick and other early Christian missionaries working amongst the Western barbarians. The fire-drill was in use in the German forests at the beginning of historic times; vestal virgins and sacred lamps never allowed to go out existed in Rome during pagan times. Though we should mention that in Roman

Catholic countries a light is kept burning, and nuns have still charge of it, we must be careful to avoid any irreverence or misconception. For the idea represented by the ever-burning light is not a superstition but a beautiful symbol only.

But to return to the gross superstitious use of the fire-drill. In a lake village in Bosnia (Sava, near Douje) of the Bronze period, a drawing of the svastika was found.[3] That is not suprising, for amongst the Serbs, Bulgarians, Western Macedonians, and other Slav races, there still goes on a ceremonial kindling of new fire by the sacred drill, and these are overgrown with many superstitious ceremonies. In the village of Setonic all fires are extinguished if an epidemic disease breaks out. The people are then made to crawl through a small tunnel on all fours, and are marked with a cross on the back as they emerge; after this they receive the new fire.[4] Practically the same ceremony was used at Simbirsk as late as 1892.[5]

There is a slight variant in Montenegro, where, according to Miss Durham, fever patients themselves are still made to work the fire-drill, with presumably the idea that their high temperature will pass into the new fire.[6] The Tschuktschis, or reindeer-hunters of North-East Siberia, still light the sacred fire on feast days with the fire-drill.[7] In British India the new fire (Agni) is still new-born of the twirling firesticks, and the svastika is very commonly used.[8]

But the most interesting point is that not only the use of the fire-drill, but the idea of a sacred fire, and of vestal virgins, and of the svastika symbol, all occur in America also. The resemblance of the ceremonies amongst the Mixtecs to those in use in India is quite remarkable. There was the same ceremonial rekindling by the friction drill, both in Mexico and Peru, and in the latter country there were vestal virgins of a curiously similar character to those in ancient Rome.[9] What looks like the svastika also occurs as a basketry ornament in Central America.[10]

The fire-drill is used by the Natchez, Cherokees, and Ogibways Indians, and also in Central Brazil.[11]

Should, therefore, there be a race which extended from Ireland to Peru, via Behring Strait, but which did not enter Africa or Australia, this curious similarity may be worth referring to (see p. 261). The other prehistoric methods of making fire are not so interesting. The Eskimo, who habitually use flint and iron, are also acquainted with the friction method. Flint and iron pyrites seem to have been used in Glacial or Post-Glacial Europe.

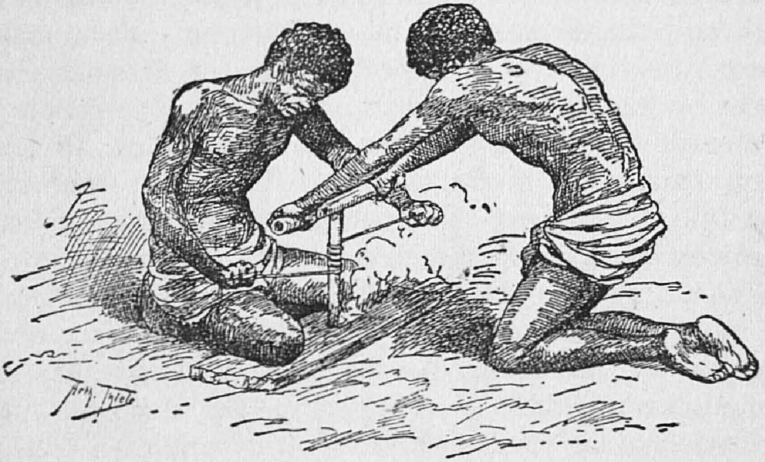


FIG. 7.—FIRE-DRILLING, WEST MADAGASCAR (FROM A PHOTOGRAPH): TYPICAL STRING-DRILL.

(Frobenius, *Childhood of Man.*)

But to a race which used flint constantly, the discovery of flint and iron does not seem at all improbable; it is hardly possible that they could ever have entered a cold climate if they were not already acquainted with fire, and knew how to kindle it.

But, as we have already shown, fire was of the first necessity to Pliocene man, and its possession was a privilege so precious that it is not at all surprising if he regarded it with some veneration and gratitude. A knife of his own would be the next great advance, and probably almost as

revolutionary in its effects. What, however, was the original knife made of? There are at least three distinct theories.

Owing to the elaborate researches and profound study of flint weapons in Europe, most people are apt to assume that the very first tool was a stone coup de poing, held in the hand, and used to smash and batter shellfish or nuts. We have already seen that not only apes, but birds, occasionally do this (see p. 64).

According to Dr. Noetling, the original Tasmanians had hardly advanced beyond this "eolithic" grade. They had no idea of chipping or "knapping" flint or other stones, but simply shattered them by throwing them down on a rock.[12] This, however, is not compatible with the scrapers, coup de poings, etc., figured by Dr. Sollas from Professor Tylor's collection.[13] These stone implements are certainly of Palæolithic efficiency. Yet the Tasmanians had spears which they could throw sixty yards, and which would pass through the body of a man at that distance, as well as formidable clubs, wooden chisels, and the like. Stone implements are not by any means characteristic of most pygmy tribes, and are difficult to obtain in forest countries, especially where there is no flint. Moreover, they are far more difficult to manufacture, and require a certain degree of patience and perhaps good temper. We have no right to assume such characteristics in the very earliest of mankind. Dr. Seyffert suggests that the original idea of a weapon was suggested by the claws or teeth of an animal. The Bakaira do, in fact, still use as a knife the lower jaw of the Piranyi fish, which is beset with small three-cornered teeth. The Neanderthaler in Palæolithic times seems to have occasionally used the jawbone of the cave bear, with teeth attached, as a weapon or tool of some kind.[14] In the Far Eastern seas, shark's teeth and sharp-edged shells are still used in many ingenious ways. The original Toalas in Celebes also used Babiroussa tusks apparently as arrows

or lances. Mothers in Tongatabu still shave their children's heads with shark's teeth, and the native surgeon cuts small pieces out of his living patient's skull with the same primitive operating instrument. Shells are also employed throughout the Pacific Ocean, even in Tierra del Fuego, and on the Amazons for a wide variety of uses. The Aino until quite recently reaped his harvest with a mussel-shell.

Still, though these and other instances, of which a very interesting list is given by Seyffert,[15] may be quoted, there is hardly enough evidence to convince us that teeth and shells were the very first weapons of mankind. The Pliocene

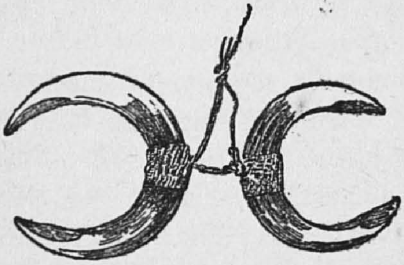


FIG. 8.—BOAR'S TUSK ORNAMENT (IN THE POSSESSION OF DR. BRANDT). FROM THE UBANGI, NORTH OF THE CONGO. (Frobenius, *Childhood of Man.*)

precursor may have thrown stones and used them for breaking shellfish before he became man, but it was in the branches that he originally lived. Generally it is branches and twigs that are thrown by the orang and other monkeys. The idea of a cutting instrument is more likely to have been derived from an experience of something that cut his own skin. The bamboo splinter, which is still used as a knife, is quite a common form of knife in Indo-Malaya and the Great Islands.

If, as we have suggested, fire was first made by scratching one bamboo against another, then it is quite likely that an accident to himself showed him the possibilities of the bamboo splinter as a ready-made tool of great promise. In New Guinea a band of Tugeri head-hunters

decapitated three convicts, who had left the gang, *in five minutes*, with a neatness of execution that, according to the ship's surgeon, could not have been surpassed in a modern operating-room.[16] The bamboo-knife is 30 to 50 centimetres long and 5 to 7 centimetres in diameter, and is nothing but a splinter stripped from the cane, though it has a natural edge as keen as the finest-tempered steel. Elephants are still killed by the Semang in Malaya with nothing but a fire-hardened splinter of bamboo touched with poison. Small parties of two or three hunters lie in wait for the game, and, approaching from behind, drive the splinter into the sole of the elephant's foot.[17] Lances are also made of bamboo, and it is one of the most generally useful of all plants.

But there are certain significant points in the habits of chimpanzees, gorillas, and orang-utans which throw light on the first equipment of mankind. The chimpanzee does not build a nest, but one species (Calvus, the bald variety) which lives in the Gambia (West Africa), makes a kind of umbrella-shaped covering of branches tied together by wild vine. This is arranged above the flat branch upon which he sleeps. Both the gorilla and the orang-utan make nests, and are able, in a rough way, to twine branches together.

When we turn to the primitive pygmy peoples of the Indo-Malayan region, we find that they make great use of creepers or wild vines; they snare game by means of nooses of these lianes, of which there is an enormous variety in the Indo-Malayan forests. Such snares are amongst the most effective known to mankind, and are still in use, even in Scotland, where wire for snaring rabbits is still sold regularly. Dr. Paul and Fritz Sarrasin, in their recent visit to Celebes, found that the earliest folk of that island (a pygmy or Veddah-like race) had advanced a little farther, for they made a sort of string bag by means of creepers knotted together. One of the most difficult problems is to know how the pre-

cursor managed to carry his tools if he went about on foot; but if he lived at first in a jungle full of creepers, and had advanced ever so little beyond the technical skill shown by chimpanzees and orang-utans, he would probably carry them in a rough knot of wild vine, or a very rudimentary "string bag."

We see, then, that the origin of this useful article can be traced back to a time of immemorial antiquity.

After an apprenticeship with bamboo-knives and creeper withies, it is not a great step to the manufacture of the wooden spear or the club of the Tasmanian, and not so very much farther to the proficiency shown by the Australian black fellow in dealing with wooden weapons. Messrs. Spencer and Gillen recently saw a kangeroo killed by the wooden spear; then its tendons were skilfully extracted and the meat cut up with a sharp digging stick, afterwards the skin was pegged out with wooden skewers.

We have seen also that monkeys do throw stones. These are probably picked up at random. Even in captivity they have been known to have a rudimentary feeling of ownership. The chimpanzee, "Edgar," kept in a small tin the two stones which he used for breaking nuts. It seems, then, that the Pliocene precursor, if we suppose him ever so little more intelligent than the modern chimpanzee, would have no difficulty, *when he crossed the boundary and became human*, in arming himself with the following weapons: Fire apparatus, at first two bamboo pieces, and later the wooden twirler and counterpiece with tinder; rough shillelaghs of wood, some for throwing and others for use in the hand; lances and spears of bamboo, and later of wood hardened in the fire; possibly a "tooth-brush" of soft wood and perhaps skewers. He might also possess throwing-stones—*i.e.*, natural stones found to fit the hand and others of Eolithic or pre-Chellean type very likely also "scrapers," or stones used to scrape off the bark and prepare his wooden weapons, perhaps to remove the skin of the animals he killed.

and also to scrape himself with. We think he would carry a selection of the most essential about with him in a very rude kind of string bag. He would make and set his snares in the jungle, but it would not be at first at all usual for him to catch large animals. Honey, insects, fruits, and possibly roots would be his main stand-by. If an occasional animal was killed, it would be a rare and unusual treat.

Unfortunately if the reader will glance over this list of weapons, the only tool which we could possibly expect to recognize after a thousand years would be the stones. Everything else is perishable and would vanish, leaving no trace of his real armoury. It is possible, however, that the men of Solutré snared wild horses, for, to the author, this is the right interpretation of certain engravings which will be discussed later (see p. 157). But we have no proof as yet of the use of nets or snares by the earlier Palæolithic races. At this point, however, a step had been taken by humanity, of which the magnitude is hardly realized until one reflects upon it. The difference between a chance stone or stick and an actual tool to cut or pierce or smash with involves a tremendous evolution. With even the idea of one tool, there is not nearly so great an advance in the conception and manufacture of many varieties. These two great discoveries, then—the idea of making and using fire and the conception of a tool—cannot be explained. Man, but no other animal, attained to them, and although we have tried to show the exceptional conditions of environment which may have made these discoveries possible, we must point out that how he made them remains an unsolved mystery.

[1] Mason, *Origin of Invention.*
[2] Mason, *loc. cit.*; and Frobenius, *Childhood of Man.*
[3] Truhelka, *L'Anthropologie*, 1902.
[4] Titilbach, *L'Anthropologie*, 1901, p. 205.
[5] Drzewina, *L'Anthropologie*, 1904, p. 106.
[6] Durham, *Jour. Roy. Anthrop. Inst.*, 1909.
[7] Bogoras, *Arch. f. Anthrop.*, 1907, p. 213.
[8] Tylor, *loc. cit.*

[9] Schmidt, *Arch. f. Anthrop.*, 1908-09; Seler, Bur. Am. Ethn., 1904, p. 28; Tylor, *loc. cit.*; Mason, *loc. cit.*

[10] *Ibid.*

[11] Dr. von Steinen suggests that fire was discovered in Brazil *as a consequence* of boring holes in wood with a wooden point instead of with shell or stone. But it is surely more likely that the fire-drill came first, and that races who used it discovered how to bore holes in consequence of their using it (*Unter d. Naturwolk. Zentral Brazilen*, 1894).

[12] Noetling, *Arch. f. Anthrop.*, 1909.

[13] Sollas, *loc. cit.*

[14] *Arch. f. Anthrop.*, 1911.

[15] Favreau, *L'Anthropologie*, 1908.

[16] Pratt, *Two Years with New Guinea Cannibals.*

[17] Skeat and Blagden, *Jour. Anthrop. Inst.*, vol. iv., p. 426.

CHAPTER VII

THE ICE AGES

THERE seems to be a suspicion that the Great Ice Age was by no means the first occasion on which a large part of the Northern Hemisphere was overwhelmed by ice and snow. There may have been many others occurring at intervals all through geological time. That, however, is beyond our province; nor can we deal with the many ingenious speculations regarding the cause of the Glacial period, although these are not without interest.[1]

But, as we have already shown, there were certainly periods of elevation and of depression, and these movements apparently both preceded and marked the close of, the great Ice Age. There seems to have been throughout the whole period a rhythmical oscillation in the climate as well as an alternation between valley-erosion and valley-filling. Now, an elevation on the grand scale of Northern (Eastern) America, Greenland, and North-Western Europe would in itself profoundly alter the whole climate of America and Western Europe. Great snow masses would gradually accumulate in the higher land thus elevated. Ice from the Arctic Ocean would not reach the Atlantic, and this would alter both the temperature and the salinity of the sea.

One effect of such an elevation would be that the present climate of Portugal would extend up to and along the then south coast of England (which would extend much farther to the south and west). Another would be to prevent the present south-westerly gales bringing rain to many districts of Central Europe, which

at present have a good rainfall (so causing Steppe conditions, see below).

Supposing that afterwards depression of the land followed (perhaps through the mere weight of the ice-sheet),[2] the conditions would again change. Ice from the melting snowfields and from the Arctic would enter the North Sea and the North-West Atlantic, and as a result of this the climate would pass, first through a stage like our own, but then become infinitely worse, more like that of the Antarctic to-day. It is, at any rate, true that these successive changes of climate did occur, not once, but at least four times, during the Ice Ages, and that there were changes in comparative levels of land and sea. In order to explain the story of mankind in Europe, we must look rather more closely at the effect which these alterations of climate must have exercised on the plant and animal world. For the first men seem to have been strictly dependent on the plant world, almost as much so as other animals.

We take up the course of history (where we left off) in the Middle Pliocene. Southern Europe and the Siwalik Hills in India were, in places, covered with a luxuriant, warm, and perhaps subtropical forest flora, in which wandered several species of anthropoid ape. Then the climate began steadily to deteriorate. Cold blizzards, furious south-westerly gales, heavy snowfalls, and cold, wet summers became annually more and more frequent in consequence perhaps of the continued depression of North-Western Europe. Ice was entering the Baltic, and cold water reached as far as Chillesford. All the Pliocene apes adapted to a warm, semitropical forest would either be forced to migrate into Africa, or be exterminated. The cold and ungenial conditions would obviously be far less marked in Spain and Italy than in Northern and Central Europe. After this first maximum of cold (Gunz) had passed, and the land had begun to rise again, the climate would again begin to improve; not only so, but the character of the vegetation would alter, and, in con-

sequence of both of these changes, the animals would also differ. But the process of elevation and these various changes would not be sudden, but slow and exceedingly gradual. Although every one knows that this was the case, it is not so easy to realize the effect that the gradual nature of these changes must have had on the first folk of Europe.

It has been possible in Scotland and Scandinavia to trace exactly what happened in the vegetable world after the last (or Wurmian) Ice Age. At the height of this period, purely Arctic plants, such as the dwarf willow and polar birch, were growing almost at sea-level in Southern Scotland. So, in this first stage—(1) Most of the land was a desolate and bleak expanse of sodden, spongy tundra, with miserable sour grasses and occasional starveling willows and other flowers. In such a country only a few northern rodents—the Arctic fox, musk-ox, polar bear, seals, penguins, etc.—could find a living. (2) As the climate improved, a sort of birch-aspen-scrub of a very miserable character seems to have overgrown all the better lands. On this vegetation many more animals could exist, notably the reindeer, and perhaps the elk or moose, as well as the musk-ox. (3) The next stage was the formation of a forest of Scotch pine, which clearly lasted in Scotland for an enormous period. Many more animals could live in this forest, such, *e.g.*, as the Arctic (or Scotch) hare, red deer, perhaps roe, beaver, and others. (4) Then the Scotch pine was displaced by an oak forest or scrub, which, however, hardly managed to displace the original Scotch-pine forest over more than a small proportion of the country. (5) In England and Denmark there was another change in the vegetation, for beech-woods displaced the oak, and became dominant. (6) If we go still farther south, the changes were even more remarkable, for rich mixed forests, with such trees as walnut, edible chestnut, and the like, have overgrown places which, in the height of the Ice Ages, may have

been reduced to a birch-aspen thicket, or perhaps poor scrubby conifers.

Now, in the various vicissitudes of climate that characterized the Ice Ages, there were the most extraordinary collections of—at first sight—incompatible animals living in Europe. One finds at certain periods reindeer in Spain, and perhaps on the very shore of the Mediterranean. At others, elephants and hippopotami flourished by the Thames, by the Seine, Somme, and Rhine. But these changes in climate and in vegetation explain most of these puzzling problems.

One might almost say that each of these successive vegetation periods has its own elephant, its own rhinoceros, a special horse, as well as cattle and deer, peculiar to itself. All of them wandered north or south as the vegetation altered during these slow, gradual, climatic changes. Yet this is not exactly true, for most range through two or three of these special vegetations.

The mammoth (as we shall have to show afterwards) lived both in the birch-aspen and in the Scotch-pine forests. Its woolly coat helped it to endure the cold. The base of its tail also ended in a heart-shaped or triangular fatty expansion 4½ inches wide, convex and hairy outside, which is supposed to be an adaptation against cold, like its small ears.[3]

By an accident we know what it was in the habit of eating. The specimen found in 1806 had been chewing pine-needles. The one which died at Berezowka, in North-East Siberia, had been eating carex, wild thyme *Papaver alpinum*, and buttercups (*Ranunculus acris*, var. *borealis*).

To birch-scrub and pine-forest belong, besides the mammoth (*Elephas primigenius*), the woolly rhinoceros, lynx, red deer, polar bear, roe deer, and, perhaps, musk-ox. To the pine-forest and oak-forest belonged such animals as bison, red deer, roe deer, grizzly bear, and a whole series of others, such as wolf and forest horse. To the oak-forest and more genial climates, *Elephas antiquus*, *Rhinoceros*

Merckii, hippopotamus, urus (*Bos primigenius*), red, roe, and fallow deer, brown bear, lion, hyæna, and wolf, etc. To the more genial forest and those of a subtropical character belong *Elephas meridionalis*, *Rhinoceros etruscus*, machairodus, hippopotamus, and many extinct animals. It was with this last association that man first made his appearance in Europe. But these were not the only alterations in climate caused by the Ice Ages. Those just mentioned are due to differences in warmth without any marked differences in rainfall. In Europe to-day Steppes extend westward into the south of Russia, and these owe their origin to cold drought.

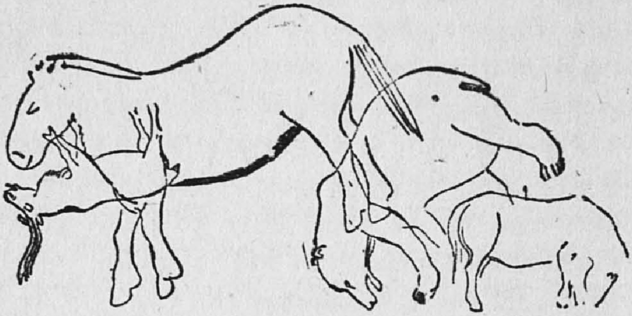


FIG. 9.—HORSES, BEAR, AND REINDEER, DRAWN BY MAGDALENIAN ARTIST, IN CAVE OF LA MAIRIE, TEYJAT, DORDOGNE.

Reproduced by permission of M. l'Abbé H. Breuil.

Most of the European rainfall is brought by warm, moisture-laden winds from the Atlantic, but these winds have precipitated their water before they reach the present Steppes. It seems, then, at certain stages in the Ice Ages, either the sea was much farther off to the west, or the rain winds were deflected south, so as not to reach a large part of France and Germany. These steppes of the Ice Age were, so far as one can judge, very like the prairies of Nebraska, Cherokee County, Iowa, or the neighbourhood of the Black Sea (at Ingul), or to Alexandrowsk. They were probably subject to terrible blizzards, but they were by no means deserts. In the spring, very likely, hyacinths

and tulips, veronicas, thymes, bugles, periwinkles, and thistles would flourish. But by the month of July almost every plant would have vanished, saving only the hardiest of chenopods and the wiriest and toughest of grasses, such as Stipa and Kœleria. So during a large part of the year, violent east winds would carry with them quantities of sand and dust. It is this wind-borne or eolian sand which forms those immense sheets of loess found deposited in the valleys of Germany and Austria, and clearly blown and laid down by the wind.

The "ergeron" and "limon" of France, and possibly the "brick earth" and "loams" of England may, at least in part, have been produced in the same way. But the farther west, the less marked are the Steppe formations, which, of course, is exactly what ought to be the case. Such Steppes in the Black Sea region are interrupted, more or less, by patches of oak-forest, and the rivers also have sometimes a belt of woodland. The Steppes of the Ice Age seem also to have allowed of forest islands where animals other than those peculiar to this formation could manage to hold their own. The Steppes were occupied by a distinct series of animals, of whom the Steppe horse (of Prjevlaski), the Saiga antelope, the wild ass, and a few rodents are the most important. They do not seem to have been marked in Europe until the later Ice Ages, and, as we shall try to show, a new type of man seems to enter Europe with the Steppes.

The changes of animals seem at first sight hopelessly complicated, but it is not really so, for there might quite well be places where the Steppe and forest met, and in which an enormous number of apparently incompatible animals could have existed, though at different seasons of the year. In order to simplify the question as much as possible, we have so far spoken only of one Ice Age, but in reality there seem to have been in Southern and Central Europe four great changes of climate. Each began in the same way by a deterioration in climate,

reached its maximum of genial conditions, and then the climate worsened as its succeeding cold phase, or another Ice Age, came on again. In order to prevent confusion, we venture to introduce here a table based on the views of Penck and Bruckner, James Geikie, Sollas, and others. We introduce this in fear, but also in hope! We feel quite certain that it is only by a time-scale, and by such a general scheme, that the general course of man's history can be traced. It is too much to expect that it should be accurate in every detail. Though we feel sure that it will be vehemently objected to by a few, we think that it represents the present-day opinion of some of the most eminent authorities. The time, half a million years, is, of course, only an approximation.[4]

We have tried to keep down all names to the lowest possible number, and although it would have been more in accordance with the rules of priority to use Professor J. Geikie's terms, we have reluctantly adopted those of Penck and Bruckner, which are employed almost universally on the Continent. Moreover, by a fortunate chance, "Gunz," "Mindel," "Riss," and "Wurm," are not only mostly words of one syllable, but in alphabetical order, and therefore more easily remembered. By adopting these terms also, we need not use such words as "pliocene," "holocene," "pleistocene," "quaternary," "first, second, or third glacial diluvium," "alluvium," and the like.

We left our Pliocene precursor in the meeting-place of three continents (East and North of Suez, West of India, and South of Russia). We do not know the animals amongst which he lived during the period of transition, but it is worth noting that in the Pliocene deposits of Northern India which are nearest to him in time and space, there were at least six Elephants, including Stegodon, and five Mastodons, three Rhinoceroses, Horse, Hippopotamus, a Buffalo, a Bison, and three kinds of Ox, one Bear, three Hyænas, five Felis (Lion, Tiger, etc.), and two Sabre-Tooth Tigers. Man's first appearance in Europe

Animal Life in Central Europe.	Chief Tribes or Industries.	England.	France, etc.	Germany, etc.	Date.	Period.	Snowline in Alps.	Geology.	Climate in Europe (Central).	Plants.
Modern, but with survivals of *old forest fauna*	Cromagnon Race * Azilian * Furfooz Race Pygmy Race in Europe	–	–	Istein, Schweizerbild	5,000 B.C.	Daun	2,400 metres	–	Modern	–
Old forest fauna—viz., bison, urus, forest horse, elk, beaver, wolf, grizzly, etc.		–	G. des Enfants (*a, b, c*)	Kesslerloch	8,500 B.C.	Gschnitz	2,100 metres	Scotland 25 to 30 foot beach	Cold, temperate	Scots pine Peat Scotspine (Scotland)
Old forest fauna and *cold fauna*—viz., mammoth, woolly rhinoceros, reindeer; and *steppe fauna*—viz., steppe horse, saiga, wild ass, bison, steppe rodents	Magdalenian → East → East → Africa	Cresswell (*c*), Gower (*b*), Kent (*b*)	Mas d'azil, Cromagnon, Combe Capelle, Laugerie, Solutré, Hoteaux, Placard	Schweizerbild, Predmost	12,000 B.C. 20,000 B.C.	Bühl Younger loess	1,750 metres –	Scotland 40 to 50 foot beach Retreat of sea in Scotland	Cold, dry, temperate, or Siberian Steppe Warm, temperate ↑	Lewis' Arctic plants (Scotland) Steppe plants Oak-forest Steppe plants Scots pine or conifers
Musk-ox, reindeer, arctic fox, polar bear	Solutréan	–	–	–	40,000 B.C.	WURM Ice Age	1,550 metres	In *Scotland* sea-level + 100 to 135 feet	Arctic	Arctic willow, dwarf birch, and tundra
Cold fauna as above *Steppe fauna* as above	Moustierian (cold) * ← East * Negroids ← Africa	Kent (*a*), Cresswell (*b*), Les Cottes, Jersey, Windmill Hill, Ponder's End (?)	Many caves in Dordogne, Malarnaud	Munzingen, Sirgenstein, Voklinshofen		Ancient loess	–	–	↑ Siberian Steppe Cold, temperate	Steppe plants, with local Scots pine and birch
Old forest fauna as above, but with *R. Merckii fauna*—viz., *Elephas antiquus*, *Rhinoceros Merckii*, hippopotamus	Moustierian (warm) Aurignacian ← Africa viâ Tunis	Cresswell (*a*), Gower (*a*), Kirkdale, Newydd, Longcliffe, Tilbury skull	Le Moustier (Hausers), Spy, La Quina, La Ferrassie, Chapelle aux Saints, G. des Enfants (*k*), G. de Prince (*c, d, e*)	Taubach, Rheinf Herne, Krapina, Wildkirchli		Warm phase	2,500 metres	Europe extended westward to 100 fathom contour (Durnten, Uznach beds)	Warm, temperate	European forest much like to-day
Steppe and cold faunas, but fewer animals; cave bear	Acheulean	Galley Hill, Bury St. Edmunds	Denise	–	100,000 B.C.	Ancient loess	–	–	Siberian ↑ Steppe Cold, temperate	Steppes with local conifers and oak
Musk-ox, reindeer		–	–	–	150,000 B.C.	RISS Ice Age	1,450 metres	Chalky boulder clay in England	Arctic	Tundra, birch-scrub
Mammoth and woolly rhinoceros, cave bear		–	Villereversure	Sipka (?), Capri			–	–	Transitional	?
Old forest fauna as above; also *R. Merckii* fauna; *Elephas meridionalis*	Chellean ← Africa	Holden's palæoliths, Wolvercote (?)	Chelles	Hundisburg, Gera			Over 2,500 metres	–	Warm and wet (?)	Forest luxuriant Vine, walnut, horse-chestnut
Mammoth woolly rhinoceros (?), cave bear		–	–	–	370,000 B.C.		–	–	Transitional	?
Musk-ox	–	–	–	–	420,000 B.C.	MINDEL Ice Age	1,450 metres (?)	Lower boulder clay in England	Arctic	Tundra, birch-scrub
Mammoth and woolly rhinoceros (?)		Prestwich and Harrison flints (?)	–	–			–	–	Transitional	?
Old forest and *R. Merckii* faunas; also *E. meridionalis*, *Rhinoceros etruscus*, *R. leptorhinus*	Piltdown ← Spain Torralba ← Africa (?) Heidelberg ← (?)	Eoliths, Cromer forest	St. Prest, Abbeville	Upper Terrace, Somme			Much over 2,500 metres (?)	Cromer Forest bed	Very warm and wet	Semitropical forest
?		–	–	–	480,000 B.C.		–	Great lakes of Jordan and Orontes, Dead Sea + 456 metres	Transitional	?
?	–	–	–	–	500,000 B.C.	GUNZ Ice Age	1,550 metres (?)	Chillesford Arctic shell-beds	Arctic	Tundra, birch-scrub
?		–	–	–				Red Crag	Transitional	Transitional
Tapir, mastodon, *Equus stenonsis*		Doveholes	–	–				–	Semitropical	Cinnamon, etc. (?)

* According to the views adopted by M. Boule, Obermaier, Schmidt, and others, both Chellean, Acheulean, and Moustierian occur in the Riss-Wurm Interglacial. The Wurm Ice Age is Moustierian and Aurignacian; Solutréan and Magdalenian are all after the Wurm Ice Age and post-glacial. We cannot get the facts to fit in with this theory, but think that these authorities do not admit any Wurm Ice Age.

[*To face p.* 120.

seems to have been either in the Gunz-Mindel or, at any rate, in the Mindel-Riss Interglacial (see Chapter VIII.).

The so-called Chellean implements belong to the Mindel-Riss Interglacial. These have been found here and there almost everywhere in Europe, and also in Western Algeria, in the Congo basin, and in Somaliland The first Europeans seem to have entered Europe along with elephants, rhinoceroses, hippopotami, and other African and Indian animals. During the early part of the Ice Age a land-bridge connected Tunis with Sicily and Italy. This is the most likely route by which these gigantic pachyderms may have entered Europe. On the second *invasion*, then, they may have been accompanied by the Chellean people. During the advance of the ice-sheet, before the Riss Ice Age, these elephants and their companions naturally departed, probably by the same route, for Europe was no place for them.

But it seems, though this is doubtful, that some of the Chellean inhabitants held on in Europe, passing through the rigours of the Riss, and becoming in process of time the Acheulians and Moustierians, who were fairly numerous, and lived right through the next Riss-Wurm Interglacial. During the warmer part of this Riss-Wurm period, there was another, third, African invasion of elephants (*antiquus*) and rhinoceros (*Merckii*). These, however, were fewer—a specially select band of large pachyderms—not so many species as on other occasions. It seems that a new set of people, the men of Aurignac, accompanied this Riss-Wurm invasion. In all probability they came by the same Tunis-Sicily route, and probably mixed more or less with the Moustierians, whom they found in Europe. The Aurignacians seem to have lived on in Europe through the Wurm Ice Age, becoming in course of time the Magdalenians (or race of Cromagnon).

So far it will be observed that the animals of each warm phase, and probably the people, came from Africa, most likely by way of Tunis. It is known that during the

early part of the Ice Age the climate of the Northern Sahara and Egypt was much more humid than it is to-day. According to one authority, lake dwellings can be found in what is now an unmitigated desert. The route from the First Home, north and east of Suez, was therefore quite an easy one, and, as a matter of fact, Chellean implements have been discovered all along it (see p. 137). But there is one very difficult point connected with these Aurignacian-Magdalenian people. They were tall, well-built, and not in the least like either negroes or negritto pygmies. Yet we find that they had little statuettes or figurines, which bring out plainly the characteristic steatopygy and other peculiarities of the Bushman. They also had the same artistic sense and love of drawing animals often in a sympathetic, kindly, humorous way, which is also a marked accomplishment of the Bushmen.

A recent discovery in the Grottes de Grimaldi throws light on this question. Two skeletons of short "negroids" and a particularly fine, tall specimen of the Cromagnon man were discovered in the same cave, though at different levels. These negroids are dated by Dr. Mochi shortly after the Wurm Ice Age, but in Italy this was not so cold a climate as in France and Germany. As we shall try to show later, the pygmy is one of the very oldest races of mankind, and certainly pervaded Africa at very early times. If the Aurignacians came from Africa, they could hardly have avoided meeting pygmies, and probably crossed with them. The pygmy would also be a very useful person to know in a primitive stage of society. It seems likely, then, that the Aurignacians knew and appreciated pygmies, who very likely accompanied them in some of their early migrations.

But another quite different race seems also to have entered Europe either before the Wurm or soon after it. These last people are associated with the Steppe climate, and specially with the horse and other animals of that companionship, and they leave Europe as soon as

the characteristic Steppe conditions disappear. These men of Solutré carried the art of working in flint to an extreme perfection. They did not apparently come from Africa, for their characteristic flints are not found in the Mediterranean region. It seems most probable that they came from the East, for it is to the East over most of Central Asia that a Steppe climate prevails to-day. The men of Solutré seem, then, to be the first Eastern invaders of Europe.

On the scheme which we have adopted (after much hesitation), it will be seen that man, at first weak, poorly armed, and accustomed to a warm climate and profusion of food, entered Europe with a whole series of gigantic and powerful brutes. None of them withstood the influences of cold and exposure. Man, however, reinvigorated after each cold phase by new immigrants from the south, not only adapted himself to the cold and strenuous life of the north, but, as we shall see later, was destined to come south, conquer and control other races who had lived on in the comfort and profusion of semi-tropical and tropical lands.

Note.

We have not, unfortunately, space to develop and explain the scheme of the Ice Ages which we have introduced in the table facing p. 120. If one admits that there were these various stages separated by interglacials, then such an arrangement as we have made must follow.

The question is really one of geology, and as James Geikie, Penck, Bruckner, and Sollas agree as regards the general scheme of four Ice Ages, their opponents ought to show wherein their geology is wrong. M. Boule, M. Breuil, Obermaier, and other French authorities object to the arrangement given above; so also do Boyd Dawkins, Lamplugh, and other anthropologists in this country. So far as our own unprejudiced study of the evidences

goes, M. Boule still tries to reconcile all new discoveries with the scheme published by him at least fifteen years ago. The more we study the question, the more we find the explanations of Penck and Bruckner lucid and satisfying.[5]

[1] Amongst the explanations are—(1) A change in the inclination of the earth's axis; (2) a difference in the percentage of carbonic acid in the atmosphere owing to excess or lack of vegetation, and affected by the amount of volcanic dust in the atmosphere; (3) meteorological changes in the normal position of anticyclones and cyclones.

[2] This argument is used by some American geologists. If the reader cares to work out the weight of a mass of ice 3,000 feet thick covering all North-Western Europe, he will find it sounds sufficient for considerable depression.

[3] Brandt, *L'Anthropologie*, 1907.

[4] No less can be allowed. Professor Penck, from the enormous deposits of shingle and ice rubbish in the Po and other valleys, seems to require more than 500,000 years. He assumes one metre thickness of denudation for every 3,000 to 4,000 years. Professor J. Geikie, in his Munro lectures, gave as his then opinion 500,000 to 1,000,000 years.

[5] See Wiegers, *Zeits. f. Ethn.*, 1913; Bayer, Congrès Préhist., Geneva, 1913, etc.

The Piltdown Hoax of Dawson

CHAPTER VIII

THE FIRST EUROPEANS

THE first fragment of the famous Sussex skull was discovered by Dr. Charles Dawson in the autumn of 1911 close to Piltdown, Fletching, in Sussex. This fortunate discovery is, perhaps, the most important of all yet made, for it may be that the woman or man of Piltdown belonged to the very earliest of all human races.[1] The beds of brown gravel in which the skull was found have been carefully traced by Dr. Dawson, who made three borings in a thousand fields, and thus was able to map accurately the distribution of the deposit. We must, of course, follow his descriptions and those of Dr. Smith Woodward and Professor Elliot Smith, which form an excellent and the only monograph on this most ancient of skulls. The bones occurred in a dark brown gravel, consisting of Iron-stone mixed with flints.

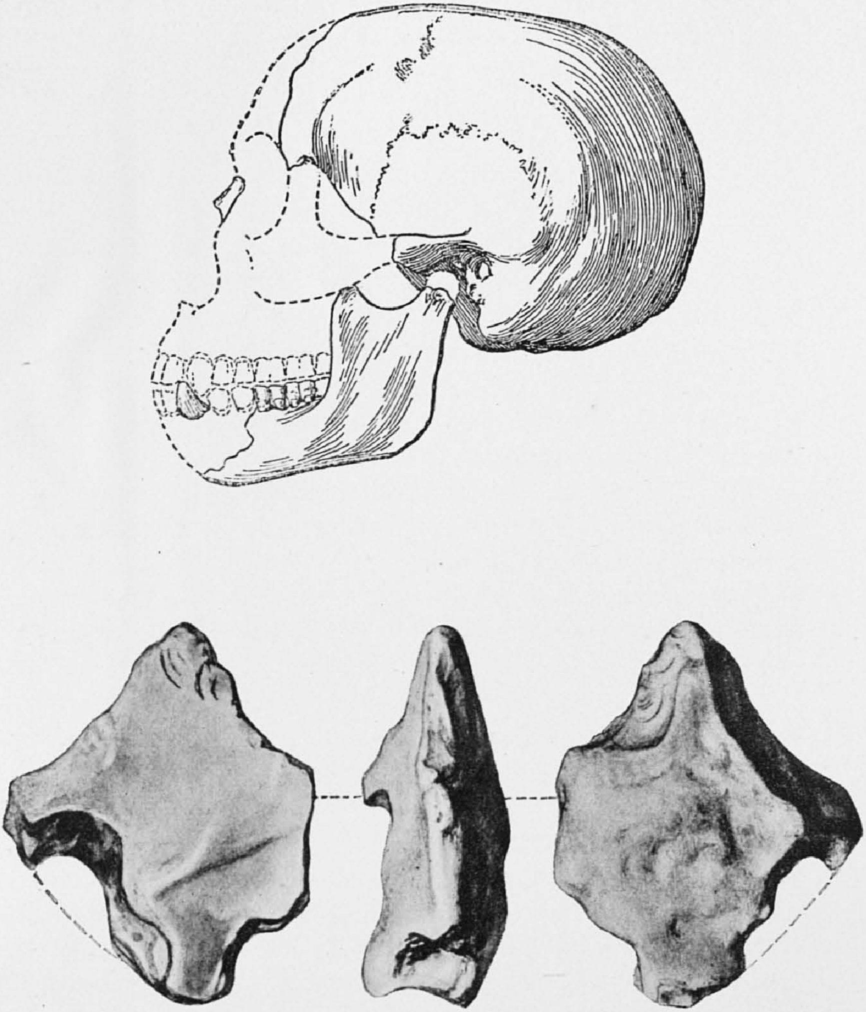
At one time this gravel lay on the surface of a plateau, which extended over the neighbouring country between the base of the Wealden anticline and the chalk escarpment. It is at from 100 to 130 feet above the present level of the sea; the River Ouse, since the time at which it was deposited, has cut down its bed for a vertical height of 80 feet. Some authorities believe that this plateau gravel of Sussex corresponds in time to the high plateau gravels of the North and South Downs, such as those of Ightham in Kent, where Benjamin Harrison, in 1865, discovered a whole series of eoliths. By a most thorough and exhaustive search at Piltdown, a very interesting collection of animal remains was obtained: *Mastodon*

arvernensis, a Pliocene elephant (*Stegodon*), hippopotamus (two teeth), horse, red deer of very large size, and a beaver, which seems to be more like the later form of beaver than the Pliocene type.

These animals would flourish in a fairly warm, temperate climate, such as that of Naples and Sicily to-day. One would expect them to live in a broad valley, with rich grassy levels or marshes, and with the higher ground covered by forest, perhaps interrupted here and there by glades or grass patches, and intersected by smaller streams and tributaries. It is obvious that they belong to a warm phase and to an interglacial interval of some kind. But the mastodon and the other elephant point to the Gunz-Mindel and the beaver to the Riss-Wurm Interglacial.

It is, of course, possible that the two first are derived from some older deposit, into which a later river had cut its course; but this argument seems (at least to us) a very dangerous one, and not of much weight, at least unless there is the clearest possible proof of this older deposit. A great deal depends on the beaver's tooth, which seems not to belong to the Pliocene beaver, but to the more recent species. The other animals are certainly found in the Mindel-Riss Interglacial, and might also occur in either of the other two.

There were also flint instruments in this same deposit. Some are decidedly "eolithic" in character. One is a very early type of borer, which may have been used to prepare spears, to skin animals, or to split marrow-bones. A deer's bones, split and scratched, have also been found in the gravel. Another is a very rude scraper, which, like those of the Kent plateau, may, as Prestwich showed, have been used for scraping round surfaces *like bones or sticks*. The Piltdown flints are certainly of a very rude and clumsy type, but it seems, at least to us, that she must have had some vague idea of what she wanted to make, which we have taken in a previous chapter as a sign of humanity. A very rude coup de poing, or boucher



THE PILTDOWN SKULL AND ASSOCIATED FLINTS

The upper figure is a restoration of the skull and lower jaw of the Piltdown fossil (Eoanthropus Dawsoni) about one-third natural size. The subsequent discovery of the canine tooth strikingly confirms this restoration of the lower jaw

The "eolithic" flint shows a flaked edge (right-hand figure), simply flaked surface (left), and edge view (middle). This was found in a depression adjoining that in which the lower jaw was discovered

By kind permission of Dr. Smith Woodward and the Geological Society

—that is, an axe held in the hand—was also found, but at a slightly higher level in the gravel. This instrument is described as Chellean, or by Mr. Reginald Smith as Acheulean (see table). The resemblance of her tools to those found in the plateau gravel of Kent (Shoreham, Eynsford, etc.) is very close indeed. We must regard her, then, as having been armed very much in the way that we have suggested for the first human being—that is, with a rough wooden club and wooden lances; she was, perhaps, clothed in skins, tied together with withies, and she may have carried one or two favourite flints in a roll of skin, or, possibly, in the very first of all string bags. But there is no evidence regarding these questions. It is in the highest degree probable that she avoided with great care all dangerous animals of large size. If they attacked, she would try to keep them at a distance with pebble, picked up anywhere, or with lighted firebrands.

In such a forest there should be nuts and fruits, perhaps roots, to be dug up with a stick, and plenty of very small game, such as frogs, insects, and small mammals. But it is the skull itself that gives the most important evidence of a very early date. Dr. Smith Woodward and Professor Elliot Smith have fully described the cranium and brain so far as the material goes, and a reconstruction has been carried out by Mr. Barlow of the Natural History Museum, where it is now exhibited.

It is the most primitive and ape-like yet discovered, saving only that of Pithecanthropus. Very low and narrow in front, the skull is gently arched above, and becomes widest and highest towards the back. The attachments of the neck muscles are very well marked. There may have been thickened bony ridges over the eyes, but there is no suggestion of the median crest, which is well marked in the Tasmanians and some other primitives. The skull is quite extraordinarily thick—in one place 20 millimetres, and from 10 to 12 millimetres elsewhere. Even the Australian and the La Chapelle

(Neanderthal race) skulls are only 6 to 8 millimetres in thickness, and that of the modern European is only 5 to 6 millimetres.

The brain is of quite considerable capacity, being 1,070 c.c.[2] That of the Gibraltar skull was 1,080 c.c. This is not less than some Australians and Peruvians, but far below the average of the Neanderthal race.

From the latter, there is also a difference in the position of the ear, which is in much the same place as in modern man. The muscles used in mastication were extraordinarily strong and powerful, but those employed in moving the tongue and speaking seem to have been but feebly developed. It is, however, highly improbable that the first Englishwoman was unable to speak, and it seems, also, that those parts of the brain which are concerned in the "spontaneous elaboration of speech and the ability to recall names" were at any rate present, or developing in a promising way. The lower jaw is heavy and massive, narrow and long rather than round and arched, and the teeth are very large, with five or six cusps. They are larger than those of the Spy specimens, but smaller than that of the Heidelberg man. The jaw in some respects resembles that of a young chimpanzee. As restored by Dr. Elliot Smith, there was a large canine tooth, which has since then been discovered, and confirms his reconstruction in a very remarkable way. Moreover, the woman of Piltdown and the man of Heidelberg are the only two human beings who had, so far as we know, no proper chin. She was not ambidexterous, but seems to have been right-handed.

We should perhaps mention that Dr. Keith has proposed a very different restoration of the cranium.[3] It will be remembered that Pithecanthropus was supposed to be the missing link. This very early form of man is far beyond Pithecanthropus in the size of the skull. Her brain was 1,070 c.c., Pithecanthropus, 855 c.c., and a gorilla about 600 c.c. It is clear that the Piltdown

woman was a human being. The base of the skull is characteristic of man, not of apes, and we have seen that this is a very important point in the view here taken of the evolution of mankind.[4]

Though there are a few distinctively ape-like characters, most of those points in which the skull differs from modern man can be detected in one or other of the primitive races. If so, she is the only representative known of one of the very earliest strains of mankind, perhaps the very first known of the original "generalized world-ranging type" from which all other varieties were derived.[5]

The man of Heidelberg is the only other European yet discovered who may be of as ancient a date as our Piltdown skull. This, the Heidelberg or Mauer jaw, is nearly complete, with most of the teeth. It also has an excessively heavy, savage-looking, and massive character, and is especially remarkable for being entirely without a chin, being in this respect unique except for the Piltdown specimen. It possesses all the characters of a very early ape-like type, being narrow and elongated—a Gothic rather than a round arch. The teeth are quite human, but the strong grinding molars are enormous, larger even than the Piltdown specimen.

Dimensions :	Heidelberg.	Piltdown.	Spy I.
First molar ...	11·6 × 11·2 mm.	11·5 × 10 mm.	10 × 10·5 mm.
Second molar...	12·7 × 12 mm.	12 × 10 mm.	10 × 10 mm.

Both Sollas and Munro give specially full descriptions of this famous fossil, so that we shall not further discuss its peculiarities.

The sandpit in which Dr. Schoetensack discovered the fossil is about 10 kilometres south-east of Heidelberg. The jaw was nearly at the base of a thick series of sands and gravels, which, since the discovery, have been examined with the greatest possible care. They consist of (shortly) 18 feet (Younger Loess), and, below this, 17 feet (Older Loess). These last represent the effect of sandstorms and

blizzards in Riss-Wurm Interglacial times. Below the Older Loess there is a curious succession as follows: Sand (4·63 metres); glaise, loam or mud (0·7 metre); sand (0·25 metre); gravel with blocks carried by ice (0·2 metre); sand (1·34 metres); clay (2·25 metres); sand (3·8 metres); and then the ancient gravel containing the jaw.

It will be seen that one Ice Age is represented by the gravel with erratic blocks. Was this the Riss or Mindel? If it was the Mindel Ice Age then the clay below and the glaise above would represent the middle of the Interglacials Gunz-Mindel and Mindel-Riss respectively. They are in each case followed and preceded by layers of sand, which seems right enough. But if this erratic block gravel is due to the Riss Ice Age, it is not very easy to see why it should be followed by sand, glaise, another 14 feet of sand and *then* by the Older Loess, which marks the beginning of the Riss-Wurm Interglacial. Let us see what light is thrown on this difficult question by the animals which accompanied the Heidelberg man not only in life, but also in death, for they were drowned in the same floods. These were *Elephas antiquus*, *Rhinoceros etruscus*, two bears (both Pliocene), cave lion, wolf, boar (*Sus scrofa priscus*), red deer, roe deer, *Cervus latifrons*, bison (*new species*), beaver, horse (*Equus stenonsis*); and shells similar to those of the Cromer Forest bed.

At Torralba, near Soria in Spain, the Marquis of Cerralbo discovered a most interesting series of elephant teeth and other fossils. Along with these were found certain very rude tools of quartzite, even less well fashioned than those of Piltdown. The spot is on the Sierra Ministra at a height of 1,112 metres above the sea, and the hunters seem to have established themselves just above a steep descent leading to an enormous amphitheatre which may have been a lake. They had a north exposure.

The place where the fragments of teeth, bones, etc., were discovered seems from the description to have been

a hole or ravine used as a kitchen midden. By a fortunate accident a landslip, or perhaps an earthquake, detached an enormous mass of loam full of lime, which covered the refuse-hole with nearly 6 feet of débris. The fossils and tools are cemented together by the lime; and we may add the spot has been visited and the circumstances noted by the very best authorities, such as MM. Breuil, Cartailhac, Obermaier, Smith, and Schmidt.[6] The following table is a list of some of the animals found at Piltdown, Mauer, Torralba, Cromer Forest bed, and in the Nerbudda valley:

ANIMALS OF CROMER FOREST BED, PILTDOWN, HEIDELBERG, TORRALBA, AND NERBUDDA VALLEY.

	Cromer Forest Bed.	Piltdown.	Mauer, Heidelberg.	Torralba, Spain.	Nerbudda Valley.
Mastodon arvernensis ...	—	*	—	—	—
Elephas meridionalis ...	*	—	—	*	—
" *antiquus* ...	*	—	*	*	*
" *stegodon* ...	—	*	—	—	*
Rhinoceros etruscus ...	*	—	*	*	—
Hippopotamus	*	*	—	—	*
Horse (species ?) ...	*	*	—	—	—
Equus stenonsis	*	—	*	*	—
Red deer	*	*	*	—	—
Roe deer	*	—	*	—	—
Cervus latifrons	*	—	*	—	—
Boar	*	—	*	—	—
Beaver	*	*	*	—	—
Bears, two species (Pliocene)	—	—	*	—	—
Machairodus	—	*	—	—	—
Shells (certain special) ...	*	—	*	—	—

It will be seen that there is, so far as the evidence goes, a very close similarity in the animals known to the Piltdown people, the Heidelberg man, the Spaniards at Torralba, and perhaps also to those who lived in the valley of the Nerbudda. It was undoubtedly a very

early period for stegodon, machairodus, and the two bears can hardly have survived later than the Riss Ice Age. As a whole, and forgetting the convenient theory of a mixing up of the remains, these point to the Gunz-Mindel Interglacial. Now let us consider the general argument from the bones. Both Piltdown and Heidelberg differ from any known race of mankind. They are certainly of older date than the Neanderthalers. So far as their evidence goes, then, they are older than the Riss period. The Piltdown tools and those of Torralba are *pre-Chellean*. They are older and ruder than those common in the Mindel-Riss Interglacial.

So, though the reader is advised that the authorized version of the evidence is to place both Heidelberg and Piltdown fossils in the Mindel-Riss, the author himself believes that they belong to the Gunz-Mindel, as shown by these considerations.[7]

In other parts of Sussex, and in Kent, really splendid collections of flint tools have been made, but it is in the highest degree difficult to give even an approximate date to them. One of the most famous is the Milton Street Pit, near Swanscombe, which we will suppose was inhabited during the Mindel-Riss Interglacial. After the whole Rissian ice had passed, the valley below was occupied, during the Riss-Wurm Interglacial, by Acheulian-Moustierian folk, who may have lived in shelters under jutting rocks and the like, and left their tools near the cliff foot. Then, after all this, when the Wurmian Ice Age came on, they departed or died. We now quote what is supposed to have happened from Mr. Lewis Abbot: "A heavy frozen mass, stodgy at base, passed from the highlands down to the lowlands, ploughing up the surface material, brecciating the hard chalk as it passed . . . mixing it and the surface materials into those fascinating festoonings with which we are so familiar in glaciated areas, sweeping everything before it; the gigantic tusks and probably carcasses of the elephants and other

THE COMBE CAPELLE MAN

An ancestor of some European nations
Restored according to the directions of Professor Rutot of Brussels

large Pleistocene Mammalia; the contents of the scarcely vacated Palæolithic settlements, with everything in living freshness; and the deposits containing relics of forgotten races pellmell into a contorted, inextricable mass some 15 feet thick."[8]

Now, if these events happened as described, the Milton Street Pit implements would be of Chellean types. They would, on the plateau, be covered by the deposits due to the great floods of the Riss Ice Age. But the implements in the "stodgy mass" would be partly of the same age and date, partly belonging to all the stages of the Riss-Wurm—that is, Acheulean and Moustierian. The beautiful figures in Mr. Abbott's paper seem to confirm this view. They appear, so far as we can judge from figures, to be mainly of the same general types as the Acheulean-Moustierian, of the Somme described by M. Commont.

The flint tools discovered at Ebbsfleet, Northfleet, Crayford (by Spurrell, Stopes, and others), seem to be, in part at least, Chellean, but there are many which are surely Acheulean or even Moustierian. As we shall see later that Chellean man is supposed to have advanced into Acheulean and then into the Moustierian stage, it is probable that these settlements may date from before the Riss (Mindel-Riss Interglacial), until after that period (Riss-Wurm Interglacial).

There is another English fossil which is believed by its discoverer, Mr. Reed Moir, and Professor Keith to be of an older age than the chalky boulder clay. This, the Ipswich man, was discovered between the chalky boulder clay and the mid-glacial sands. It was at a depth of three feet only from the surface, but there was no sign whatever of any digging or disturbance such as one would expect if the man had been buried at this depth. Implements of very early type described by M. Rutot were discovered within ten yards of the spot and in the same deposit, and also the tusk of a mammoth at practically the same level.

The bones themselves were in such a position that one

could equally well say that he had been crouching on the sand when he died, or that he had been buried in the contracted position common in Early Neolithic times. He was 5 feet 10 inches in height, and had a brain capacity of 1,430 c.c. The bones of the skull are thin, only 5 millimetres in thickness. Neither in the teeth, in the jaw, or in any of the bones (save only two), is there a single character which may be safely called primitive. The whole type is modern, using this term as including the Neolithic period. Two bones of the leg (tibia and fibula) are quite peculiar and exceptional, but even they do not in any respect recall either the Neanderthal race or any other primitive people. If this is the case, we think that his Pre-Rissian Age can only be upheld if there is no reasonable objection to the geological age of the fossil. There are, however, two arguments which may quite reasonably be urged against this theory. First, a depth of only 3 feet from the surface is well within the sphere of action not only of plant roots, but of worms. Supposing that the Ipswich man belonged to the earliest Neolithic invaders (and his characteristics do correspond with those of this race) then during perhaps 7,000 or more years, this grave (filled in with the material taken out) would have been searched by roots and explored by worms; and it is at least arguable that, in that space of time, no signs of digging would now be perceptible. Moreover, if he had died, overcome by cold and hunger, when crouching on the sandhills, it really seems in the highest degree unlikely that the ground moraine could have so gently enwrapped him in a winding-sheet of chalky boulder clay that his bones remained in position with apparently none of them missing. Such fossils as are found in or about the base of the boulder clay are surely in separate bones, and often wide apart. Then again, his skull has some characters a little exceptional in modern man, though not very unusual. It is low, with the forehead a little more receding and the eyebrow

ridges about 3 or 4 millimetres thicker than is usual in British skulls of to-day. These characters and his cephalic index of seventy-five are surely quite compatible with the first Kitchen-midden folk of Europe.

We do not, for all these reasons, think it safe to assume other than a Post-Wurmian or Daun Age for the Ipswich man. The next series of remains which call for notice are the Chellean implements already referred to. One can find a nearly continuous series of them from the very rudest, barely distinguishable eoliths of perhaps Miocene times, through the various stages described by M. Rutot of Brussels, up to the Chellean, and on through Acheulian into Moustierian.

It is for this reason chiefly that we rather uphold the artefact theory of eoliths. Even the Chellean stage seems to us to imply an enormously long interval during which hand, eye, and intelligence were technically schooled, and at the stage at which we have arrived, a very important advance seems to have been made.

The Chellean tools show that the artifex had a perfectly clear idea of what he wanted to make, and could get something like it. Yet even Chellean flints are of the very roughest and rudest character.

They are, even at the very first, of two distinct types, either a flake chipped off the stone, or the original nucleus or flint from which the chip was knapped off. The Mesvinian flake of M. Rutot is a simple chip with two or three other chips clumsily broken off its outside surface. So a rude cutting-edge was formed and when held in the hand it might be used as the very first of all knives. The more laborious work of fashioning a flint nodule into the coup de poing (or boucher), or hand-axe, involved steadily chipping away all the outside surface of the stone until it formed a rudely pear-shaped instrument. But they managed to manœuvre their blows in such a way that it had an irregular sharp edge and a point more or less acute. In face view, it would be roughly broad-ovate or

spear-shaped, and in side view lanceolate or lance-shaped. The heavy lower base was held in the hand, and in Early Chellean types retained the original rough surface of the stone.

Such a lump of a weapon, if wielded by sinewy arms, would deliver a shattering blow, easily breaking the skull of a wolf, for instance; but if the first blow failed, there would be no chance of a second attempt. The hunter could hardly recover in time. It is perhaps for this reason that the largest and rudest are usually the oldest specimens. Yet the mere fact of his having this weapon would give him confidence, especially when interviewing a fellow savage of aggressive appearance. M. Rutot describes a peculiar Chellean flint dagger made by increasing the length of the *perçoir*, or borer, four or five times, which last was used to break bones or pierce skins. Such a dagger could only be of advantage in a *duel à outrance* with another man. It is this dagger, according to M. Rutot (and if we understand him rightly), which definitely marks the fact that the precursor had become really human. *As soon as he became man, he wanted to be offensive.*[9]

Unfortunately for this interesting view, there is a certain doubt as to the authenticity of these same daggers. But if the reader will examine the beautiful collections of Chellean and other flint instruments in the British Museum, the first point that will probably strike him is the pitiful inadequacy of these rude stones in times so full of danger. These borers, scrapers, hammer-stones and hand-axes were, as one is apt to think, all that he had in his hand when he went out to war with mammoths and machairodus, lions, and bears, and other interesting animals. He made his clothes and cut up his game with them. But we think this first impression is not altogether correct. His throwing stones would be unrecognizable to-day, for he would pick them up in the river gravel as and when required. Of wooden clubs, spears, creeper-snares and

THE MAN OF HEIDELBERG

The famous jaw was discovered at Mauer near Heidelberg by Dr. Schoetensack. The man had no chin

Restoration by M. Mascré under the direction of Professor Rutot of Brussels

the like, there would naturally be no trace remaining (see p. 112).

But there must have been a strong inducement to arm himself with these rudest of tools for they occur everywhere.

One of the most interesting localities is the Island of Capri, where no less than forty coup de poings have been found, and under circumstances which surely prove that they belong to the Mindel-Riss Interglacial. The loam and pozzuolane in which MM. Baldiani and Galdieri discovered these implements, is covered by a thick layer of volcanic material due to the eruptions of Phlegræan volcanoes which, according to M. Bellini, belong to the Riss Ice Age. They occur in a marine beach of very ancient date, which to-day is no less than 130 metres above present sea-level. At that time Capri formed part of the mainland, and the following animals visited the place, and were no doubt avoided by the Chellean inhabitants: *Elephas antiquus*, *Rhinoceros Merckii*, horse, hippopotamus, boar, red deer, wolf, cave bear, leopard, and perhaps a porcupine.

Besides coup de poings, scrapers, and primitive borers, flakes used as knives, and other typical Chellean tools have been found. The rock of which they are made does not occur in the island. Chellean tools also occur in the high terraces of the River Tevere and its tributaries near Perugia, and are of even rougher and ruder types. Dr. Mochi,[10] from whose description the above is taken, considers that both the Capri and Teveri finds are of earlier date than those of other places in Southern Italy (see p. 120).

They were apparently used by the earliest Africans, for near the Zambesi falls they have been discovered at a place which shows apparently that in Chellean times the river was 400 or 500 feet above its present level.[11] A specially interesting find of them was made in the Nerbudda valley, but if they occur with the bones of

Elephas antiquus, stegodon, and hippopotamus, this is a remarkable exception, for all three animals accompanied the Piltdown woman and the Heidelberg man.[12] They are also found in the very area which we have supposed to be the first home of mankind—namely, north of Zenobia, between Palmyra and Deir e Zor, as well as in Egypt, near Tunis, and in Algeria. They are common in Italy, France, and Spain, and even in Germany, and, as we have seen, in England also. Besides these places mentioned, they have been detected here and there practically all over Africa, in Somaliland, and on the Congo. They have been found in many parts of Asia, and perhaps, also, in North America.

So it will be seen that if it is allowable to suppose that they indicate the existence of the very earliest original race, the "wide-ranging generalized type" of Dr. Guppy, then this earliest man may have wandered along with the elephant and hippopotamus via Egypt and Tunis to France and England, or to Somaliland in East Africa, and south to the Zambesi.

So *from the first home*, he may have travelled, during the Mindel-Riss Interglacial, to the extreme south, or nearly so, of Africa, and nearly to the most westerly part of Europe. East of the first home, the real Chellean is said by many to extend even into North America.

Even with the scanty armoury which we have tried to describe in this chapter, man was able to live in the warm temperate or tropical forests of at least three continents. But up to and including the Mindel-Riss Interglacial, he seems to have been a member of the companionship of the elephant, rhinoceros, and hippopotamus.

[1] It does not appear certain if it is a female skull, but for various reasons this seems probable, and we shall speak of it as a woman's skull.

[2] Dr. Keith gives the capacity as 1,500 c.c.

[3] See original paper, *Q. J. Geological Society*, May 18, 1913, and Aprll 25, 1914, and *Nature*, October 16 and 23, 1913; but with Dr. Keith's suggestions we cannot personally agree.

[4] *Ibid.*

[5] *Cf.* Guppy, *Petermann's Milth.*, 1910, p. 56.

[6] Marquis de Cerralbo, Congrès Préhist., 1913.

[7] Professor James Geikie said, to the best of the author's recollection, that the Heidelberg jaw belonged to the Gunz-Mindel Interglacial in his Munro lectures.

[8] *J.R.A.I.*, 1911.

[9] Rutot, *Bull. Soc. Belg. Geol.*, 1908; also Sollas and Munro, *loc. cit.*

[10] Mochi, Compte Rendu, Congrès Préhist., 1913.

[11] Fielden, *Nature*, 1905.

[12] De Morgan, *L'Anthropologie*, 1903, p. 543.

CHAPTER IX

THE MAN OF NEANDERTHAL

In the last chapter we tried to bring together all the very earliest fossil relics of mankind, and show that, if we are correct in assuming that there was an original generalized wide ranging type of man, the woman of Piltdown and man of Heidelberg possess exactly such characters as one would expect of its immediate ancestor. If the first race of *Homo sapiens* ranged over the enormous area throughout which Chellean instruments occur, then it is very natural to suppose that these were his instruments, and that they vary so little for two reasons—first, because there had not then been time for evolution of new races, and of new industries; and secondly, because, so far as one could judge from the localities of Chellean implements, and from what is known of the ruling climate at this early date, practically the same animals accompanied him everywhere, which means that from England to India he lived in the same sort of forests and grasslands.

This does not apply to America, for though the Chellean race may have travelled a very long way eastward into Asia, we do not think that he succeeded in crossing Behring Strait until he had been mixed with and probably swamped in later races. But we must point out that at the very beginning of the Riss Ice Age, between the Miocene ape and Rissian mankind, there was an enormous interval; on our probationary scale some 350,000 years had elapsed even from the beginning of the Ice in Europe. But however little scope we allow

for climatic influences, for the effect of increasing population, and for new discoveries in food and in workmanship, there must surely have been changes in physical, mental, and moral development during this time. Moreover, Europe, as we showed in Chapter II., had begun to take its present shape, and the Old World generally had already both its mountain systems and its waterless deserts. So, during this long period, the embryo races of mankind were separated, and had begun to develop independently. The experience of those Europeans who first require notice was utterly and entirely different from that of any Asiatic or African race. It is impossible to prove that they lived right through the Riss Ice Age—that is, that they suffered the extreme severity of the cold at its worst. But they certainly accompanied those animals which were able to endure, if not the maximum cold, at any rate that of the birch-scrub and Scots-pine forest stages, which, as we have seen, preceded and followed the extremes of Arctic conditions.

So one must expect great differences from any living race of man, not only because they were primitives, but because their life was strenuous, hard, and in the highest degree difficult. It resembled in no way that of a primitive pygmy or Asiatic herdsman. What is known as the Neanderthal race seems to be the one which made and used Acheulean and Moustierian implements. It probably includes the later stages of the River Drift man and the early stages of the Cave man of English anthropologists.[1]

The remains of this early and savage type are comparatively numerous. They have been discovered at Olmo, Italy, where they were buried during an eruption of the Phlegræan volcano; at Denise in France, also of a victim to volcanic eruption. In the valley of the Vézère, Dordogne, which was a favourite dwelling-place of the early Europeans all through the Ice Ages, three Neander-

thalers have been discovered under circumstances which leave no doubt that they were buried by sorrowing friends. These consist of two skeletons found by M. Peyrony at La Ferrassie and the man of Le Moustier discovered by Dr. Hauser. Also in the same district is the rock shelter of La Chapelle aux Saintes, where an old man died, and perhaps was buried with similar rites. The unfortunate savage found near La Quina (Charente) seems to have been drowned.

At Malarnaud (Ariége) and Grotte der Fées, near Arcy (Yonne), human jaws have been discovered. Another famous skull is that from Forbes Quarry, Gibraltar, but of this the exact age is quite uncertain. Farther north in Belgium there are two skulls found near Spy (Namur), and the famous human jaw from La Naulette. The type specimen of the Neanderthal race was found at the place of that name, which is near Dusseldorf. Then there is the Sipka jaw (Moravia), and the skulls from Krapina. In England those of Galley Hill and Bury St. Edmunds differ from the type. The Kent cavern jaw may belong here also, and the Tilbury skeleton is perhaps of this age.

The Neanderthaler also lived in Jersey, where the jaw of a young man, twenty to thirty years old, and nine teeth have been discovered.

If it is justifiable to associate the Neanderthaler with Moustierian implements, then we must extend his range very much farther than this scanty list would permit.

In England he would at one time or another extend as far north as Flamborough Head, and over all the country south and east of a line from this place to Bristol.

In Belgium, these tools have been found, in many places, as at Trou du Magrite and Mesvin. In Germany also, along the course of the Rhine-Herne canal, near Weimar; at Sirgenstein, near Schwarzfeld: in Hungary: in Switzerland, Wildkirchli: at Castillo, Santander, Spain; in Portugal: in Italy at the Grottes de Grimalde, Maiella,

Santerno, Grotte de Scalea, near Carrino, and at San Ciro, near Palermo. In France his remains are abundant, especially on the Seine, Somme, Vézère, and in the Pyrenees. In Russia, there are several localities which have furnished Palæolithic instruments, but these seem to be of a later date than the Mousterian. Nor are any remains of this age known to the writer from either Greece or Turkey in Europe.

Moustierian tools have been discovered in the Lebanon in Syria. Along the north coast of Africa there seems to have been a gradual transition in the implements from Chellean through Acheulean and Moustierian times, right onwards into the newer Stone period. But there is no proof that the characteristic race of Neanderthal ever lived in either Africa or Syria.*

In his personal appearance, the man of Neanderthal was not prepossessing. His face was broad; the strong bony projections over the eyes were continued sideways along part of the outer edge of the eye-orbit, and were probably covered with thick eyebrows of long hair. His nose seems to have been short and broad, with the bridge, so to speak, curving inwards under his eyebrows. His nostrils were wide and probably opened outwards. The chin in most cases was retreating more so than in any modern race except a very few of the most primitive. In all cases, the teeth are large and increase in size backwards towards the wisdom-tooth. They are usually worn down almost to the root. The jaw is in most cases heavy and massive, with powerful muscles corresponding to the severe effort required in masticating the hard food of his time.

There is some variation in the height and capacity of his skull. In some of them, as we have already mentioned, the capacity rose to 1,500 c.c. or even 1,600 c.c. In others it is not more than 1,080 c.c. (Gibraltar). This difference is not greater than the range between extreme cases of modern peoples; for example, the Tyrolese (see p. 70).

* See end of Chapter.

That he had risen decidedly above the level of the Apes and Pithecanthropus is clear from the relation of the height of the skull to its length. In the Apes the height is 37·7 per cent. of the length; in Pithecanthropus, 34·3 per cent.; in Neanderthal, 40·4 per cent.; in Spy I., 40·9 per cent.; in Spy II., 44·3 per cent.; and in Krapina, 46·1 per cent. It is, however, *as a whole* that these skulls should be looked at, and when one does so, the brutal savage expression of this retreating forehead and fugitive chin, the heavy jowl, and louring brow are especially remarkable. M. Boule, in describing that of the Chapelle aux Saintes, says that if you find any ape-like character in a skull, it is found in an accentuated condition in the Neanderthal group.

There is also a very marked prognathism; the upper jaw projects beyond the line of the forehead, so increasing the bestial ferocity of the appearance. There are extraordinary differences in the cephalic index. (Neanderthal, 73·9 per cent.; Chapelle, 75 per cent.; Spy, 70 and 75·3 per cent.; Krapina, 85·5 per cent.). The young man of the Moustier and the woman of La Ferrassie were both 4 feet 10 inches in height. The old man of Chapelle aux Saintes stood 5 feet 3 inches. As regards the skeleton, there seems to be no doubt that the race was strong, muscular, and sinewy. There is no trace anywhere of the graceful slenderness of the pygmy.

In the more minute descriptions of the bones of the Neanderthal race there are resemblances sometimes to the white race, sometimes to the Mongol or yellow race, and sometimes to the Australian. But there are also a few ape-like characters which are not found in any of the present-day varieties of man. As these points can only be appreciated by anatomists, we shall not discuss them.[1]

The hand of *Homo neanderthalensis* was quite human, and his foot, though large, has no special characteristics. He was rather bandy-legged, possibly of a stout stocky sort of build, with powerful arms. A curious point with

regard to the arm is that the angle of torsion of the humerus is estimated at 35 degrees. In the Vedda's this angle is 30 degrees, but it is only 9 degrees in modern Europeans.[2] He was right-handed, for his brain, with the left hemisphere distinctly larger than the right, is like that of modern man.[3]

The animals amongst whom he managed to find a living were not always the same. In the south, in Italy and perhaps in Spain, the effects of the Riss Ice Age were not nearly so severe. The warm phase group—that is, *Elephas antiquus*, *Rhinoceros Merckii*, hippopotamus, and *Bos primigenius*) seem to have lived in these districts throughout the whole interval from after the Mindel,

FIG. 10.—BUSHMAN DRAWING. (AFTER ORPEN.)
(Frobenius, *Childhood of Man*.)

through the Riss, and on until they disappear towards the Wurm Ice Age. But more to the north the Riss-Wurm Interglacial divides into three more or less distinct divisions—a cold period following the Riss, a warm phase in the middle, and a Steppe period ending in the Wurm Ice Age. If, as we have suggested and as has been also postulated by Boyd Dawkins, Chellean man was of the companionship at first of the elephant, rhinoceros, hippopotami group, and first entered Europe by way of Tunis, Sicily, Italy, then it is clear that he could live quite well in Italy or Spain up to the Wurm. He would in all probability accompany these animals into France and England before the Riss Ice Age, and a few of the hardiest and

strongest individuals survived the Riss and remained in both these countries and in Switzerland until towards the Wurm, Ice Age when we lose sight of the Neanderthaler as a distinct race of man. He would therefore be associated both in France and England, sometimes with the Cold Fauna—*i.e.*, the mammoth and its almost inseparable companion, the woolly rhinoceros—and sometimes with the ancient elephant and Merck's rhinoceros. This is what actually occurs in France. It seems to us impossible for botanical, zoological, and geological reasons to believe in the theory of migrations in spite of the able support furnished by Boyd Dawkins in his recent address.[4] The question is fundamentally one of geology. Penck and Bruckner, supported by Professor James Geikie, hold that Britain, like the rest of Europe, passed through these warm and cold phases which have been actually shown to exist in Italy, France, Belgium, Switzerland, Germany, and Austria.

It is for this reason, greatly to our regret, that we are obliged to differ radically from the views held by Boyd Dawkins.[4] So that so far as one can at present see, the Neanderthaler in England and France lived through the Riss Ice Age, and the warm Riss-Wurm Interglacial and part of the Steppe period towards its end. He was a most strenuous hunter. At Taubach near Weimar, where one of his molar teeth has been discovered, remains of forty to fifty individuals of *Elephas antiquus* and of one hundred Merck's rhinoceroses, as well as of bear, bison, red deer, and beaver, seem to prove that he was well able to look after himself.

Some of the elephants' teeth show marks of fire, and their bones are split for marrow; he had actually made a sort of drinking-cup from a leg-bone (femur) of the rhinoceros.[5]

In the Grotto of the Rhinoceros, near Schwarzfeld, about 1,000 bones of the cave bear have been found. They were split to extract the marrow, and also showed the marks of fire. At Sirgenstein also they seem to have appreciated bear's flesh, and especially that of young

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According to the reproduction by M. Mascré under the direction of Professor Rutot of Brussels

animals, as indeed their descendants do still. At San Ciro, near Palermo, there is evidence that they feasted habitually on hippopotami, as is shown by the remains of some 2,000 individuals.

One cannot blame them for appreciating marrow-bones, considering the ordinary fare which probably fell to their lot. It seems likely that they grilled their meat hurriedly over a fire, and perhaps sometimes boiled it, for certain stones found in some caves seem to have been used as pot-boilers. Perhaps a hollow was dug in the cave, or near it; a skin was placed over the hollow and filled with the flesh and water. Then stones heated red-hot in the fire were dropped into the water so as to make it boil. But this is uncertain, for the theory involves that they had something in which they could carry water. It would, of course, be possible to do this in skins, but this would not be easy, so that one cannot be sure that they could boil their game. It is not a usual form of cooking amongst those races which live in the same way now. After a meal, it has been shown by Dr. Marett[6] that in the Cotte de St. Brelade (and also by Dr. Schmidt for Sirgenstein) they roughly cleared up their den by sweeping the bones into the fire.

They used iron pyrites and flint to strike a light, and probably kept a fire always burning in the caves. This would be an essential precaution to keep out cave bears and hyænas, who seem to have been excessively numerous during Neanderthal times. They seem to have been essentially meat-eaters, and though they ate birds, very few fish-bones are associated with Acheulean or Moustierian implements. It is therefore a difficult and interesting question to know exactly how they caught their animals. They can hardly have lived after the furtive style of the Bushman and the Vedda, who do not disdain insects, frogs, or snakes, for one would find bones of such very small game in the caves.

There is one place where a strong suspicion of canni-

balism rest upon the Neanderthaler. Burnt human bones occur at Krapina, and Dr. Gorjanovic-Kramberger believes that these represent the horrible relics of a race which ate each other. But, after all, cannibalism is uncommon amongst early races, and though a severe famine would undoubtedly lead to deplorable incidents, the evidence is against the theory that they ate one another habitually. Probably also it would be much more difficult to kill a Neanderthal man than almost any other animal. He certainly ate the Mammoth, Rhinoceros, Cave Bear, the Urus (*Bos primigenius*), Deer, Bison, as well as smaller animals. How did he catch them?

His weapons show an enormous advance during this period, but unfortunately without many figures we could not do justice to the minute details which have been worked out with extraordinary care by Capitan, Cartailhac, and other French anthropologists. They have explained the whole technique adopted by these ancient hunters, and have traced out all the various stages which led from the rudest Chellean coup de poing to the finely finished spearheads of the Moustierian.

There are still the two main groups of tools, the flake or chip, and the flint itself. In the lower Acheulean, the coup de poing becomes slightly smaller, more heart-shaped, thinner, and has a better point. It is altogether better finished; the artifex knows what he is about. It becomes still smaller in the Upper Acheulean stage, and divides into several forms, sometimes nearly egg-shaped, or oval, or almost triangular. In the Inferior Moustierian obvious well-made spearpoints make their appearance, and if not before this period, these were now certainly mounted on a handle, probably tied on with sinew or withy, and perhaps with resin. These heads are always getting smaller and lighter, and are still better finished and smaller in the Middle and Upper Moustierian. But in the Acheulean, and afterwards, such spearheads seem to be more usually made of flakes. The artist knew by

this time exactly how to split off a chip of the size which he required.

Even in the Moustierian, a triangular flake could be used which had a curved edge, and reminds one roughly of the woman's knife of the present Eskimo. Both scrapers and points seem to us to have been intended for domestic use; they would be used to clean and prepare skins, boring holes in them by means of the point, and perhaps tying them on with sinews or thin strips of skin. It is not at all easy to say when they began to use bone both for spearheads and a wide variety of other purposes, but this was not apparently until a comparatively late Moustierian age. M. Martin has shown that in smashing horse-bones to get the marrow, splinters of bone well suited for needles, etc., would result; but these bone implements only become general in Aurignacian times. Could anybody kill even a young mammoth with a coup de poing? Certainly it hardly seems likely. It is true that an oak-tree more than 20 inches in circumference has been cut down by a flint Palæolithic axe. It required an hour and thirteen minutes of extremely hard work, and 2,200 cuts were made, removing 4 decimetres of wood, but this hardly shows that a flint axe would be effective against a lively mammoth or wild bull.

But, as suggested above, we think the Neanderthal man had wooden lances and spears, clubs, and perhaps throwing-sticks, or knobkerries. In the Cotte de St. Owen, and also Cotte de St. Brelade in Jersey, large smooth stones (one 85 by 70 by 48 millimetres, and the other 180 by 125 by 60 millimetres) were found which, it is suggested by Dr. Marett, were used for grinding or polishing. Such heavy smooth stones might be most useful in straightening wooden lances, or even in rubbing them down. Then the Neanderthaler would almost certainly be expert in throwing stones, and these, being just round shingle pebbles, would be unrecognizable to us as weapons. How far he used snares made of sinew or creepers we shall

grants belonging also to the main Caucasic stock—that is, with wavy hair, a white skin, more or less beard, and hair on the face and features that sometimes remind us of ordinary European faces.[4] These successive waves of migration have not yet been distinguished from one another, but there were at least two or three of them. A very early hunting series is probably represented to-day by some Dravidians in India (Gonds, Santals, etc.), and as far north as Japan by the Ainus, who are one of the most interesting of all Asiatic tribes. No doubt people of this Caucasic stock used to live in many of the forests and more open lands between Japan and British India. Of these earlier hunting Caucasians, the Ainu of Japan are a particularly interesting people. They are good canoe-men, and not afraid of the dangerous seas, in which they spear fish, using the detachable harpoon-head, not unlike that of the Magdalenians. There is a strange mixture of veneration, fear, and delight in their methods of hunting the bear which has led to some very curious confusions of superstition and hunting lore. Nor are they without a touch of artistic imagination. This is revealed in their ornaments, their ceremonial rites, and in their stories. There is especially an exquisite tale of a brave and handsome young Ainu who followed the magnificent bear which he was hunting into a great subterranean cavern. Still tracking it, he eventually found himself in Hades, but discovered to his disgust that he had become a serpent.[5]

But these early hunting Caucasians were apparently followed by another swarm in Neolithic times. Physically these later comers were allied to the Mediterranean race, and they had the same passion for monumental masonry on a large scale, and the erection of dolmens, memorial stones, and the like. Such dolmens are extremely common in some parts of India; indeed, as we shall see, certain Indian clans still erect stone memorials. Stone monuments of the same megalithic character occur in many

watch, and perhaps arrange snares near the water-paths. They could, as the Red Indians used to do, drive the bison with firebrands and yells over the cliffs, or perhaps into difficult bog-holes, where at least one or two might not escape.

The country near Namur, where the Trou du Monton and Trou du Frontal open into narrow, deep gorges, is even wilder and more difficult. In fact, when one remembers the necessity of flint for the Neanderthal man, and that it is only in limestone or chalk districts that it occurs in quantity, this constant association of early man with the gorges and defiles of rugged country is not so strange after all. But in any case the life of the Neanderthal hunter must have been hard and difficult. All day long he would be cautiously picking his way in and out of the rock along the cliff-sides, through almost impenetrable thickets of bramble, blackthorn, and roses, which would cover fallen trees and occasional mud-holes; at any moment he might come across a Urus, a Lion, Bear, or Hyæna. Those flat river valleys, now fertile, and cultivated with the minute care of the French peasant proprietor, would be dense reed-beds, thickly grown brakes of alder, birch, and ash, muddy pools or stagnant oxbows, the haunt also of the most dangerous animals. He would pass silently in and about these thickets, eye and ear strained to the utmost. From the first light of dawn to the last lingering glow of the sunset he would be for ever hunting, tracking, watching.

At dusk, the really dangerous time when rival Carnivora were abroad, he would retreat to his rude rock-shelter or cave, and sleep beside the fire of branches collected by his women and children. Perhaps a rough wall or heap of stones would be collected before the entrance. Near it a pile of pebbles lay convenient to his hand. Such a life involves never-ending strain on body, brain, eye, ear, and nerve. It could only be endured by a small minority, and the selection of the fit would be

of the most rigorous character. The recent discoveries of M. Peyrony and Dr. Hauser show that Moustierian man, towards the end of his development, was by no means merely a savage brute. In three cases at least the body of the dead man or woman has been found under conditions which seem to imply a regular method of disposal of the dead. At Le Moustier, at a spot only some 5 feet above the alluvium of the Vézère, the skeleton of a boy about sixteen years of age was discovered. He lay on his right side with the right arm bent, so that his cheek lay upon his elbow. The left arm was stretched out, and within reach lay a particularly fine coup de poing (17 centimetres long) and a good scraper. Underneath his head was a sort of mosaic of carefully arranged flints. In various places around him were disposed a rich outfit of weapons and tools, including two small scrapers (one of which was extremely pretty), two burins (sharp-pointed flints for piercing holes), a sharp cutting knife, several rubbers, or scrapers, with hollowed sides (probably for wooden spears), and seventy-four other artefacts. Many bones of the Urus (*Bos primigenius*), some split for the marrow, were arranged about him.

If one remembers the practice of many living savages, this youth's burial seems to show a real affection,[7] as well as careful provision for his probable needs in a brighter and happier hunting-ground than his Neanderthaloid relatives ever knew; for the rich array of flint weapons means real self-sacrifice. Each flint was of real value, for it had involved a long toilsome and irritating labour. Yet they gave him all this precious wealth out of affection, and perhaps gratitude. It is, of course, purely a guess, but it has been suggested that he had lost his life when hunting the Urus (wild bull), and possibly after some heroic deed of daring for which his tribe reverenced him.

But the youth of Le Moustier is not the only case in which one seems to detect a certain reverent carefulness

in the disposal of the dead. One of the skeletons of La Ferrassie also lay on the right side, but with both arms and legs bent. The other lay on the back, but with both legs bent and the left arm stretched out. This also is very nearly the position of the old man of La Chapelle aux Saintes. Round him also were flint weapons, bone pointers, and bones of various animals split, so that in his future life the marrow might be ready for his use. Similar funeral customs are excessively common in practically all hunting peoples, and they are, so far as civilized man can follow the working of a savage mind, associated with a

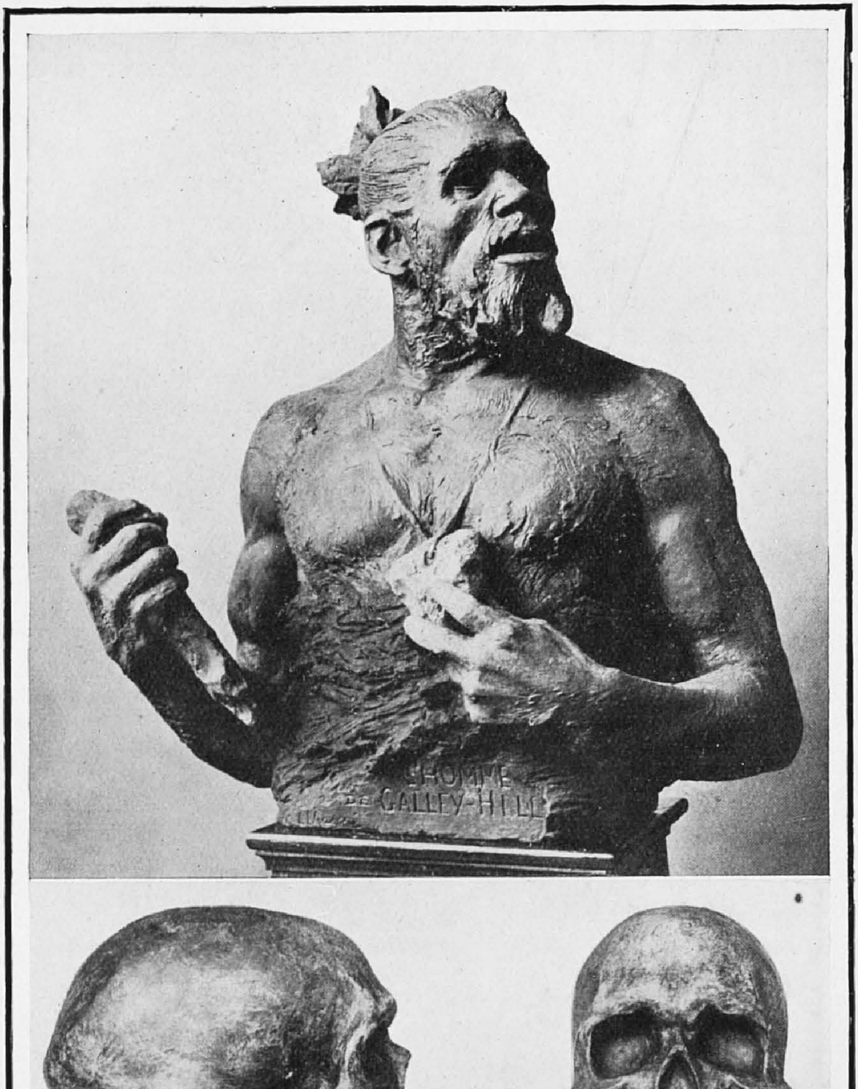
FIG. 11.—FEEDING THE DEPARTED (OFFERINGS TO THE DEAD), AMERICAN INDIANS. (AFTER HARROW.)

(Frobenius, *Childhood of Man.*)

belief in a future life. It seems, therefore, quite unnecessary to doubt that the Neanderthaler had some sort of belief in another world.

We have given above (p. 141) a short list of the places in which examples of the Neanderthal race have been found.[8] Perhaps a little more should be said of some of the more famous localities. The Gibraltar skull from

Forbes Quarry is unfortunately without any other evidence than the cranium itself, but is quite obviously a Neanderthaler. Castillo, in Spain, is of special interest, as this cavern seems to have been inhabited from Moustierian times into the succeeding Aurignacian. In France M. Commont has, with the most extraordinary care, discovered the traces of human industries in every single stage, including the Acheulean and Moustierian from the Chellean to mediæval. The minute and patient investigation by which he has succeeded in doing so cannot unfortunately be given here. One stage of the Moustierian is definitely associated in the Somme Valley with a warm fauna, which we assume to be that which lived in the middle of the Riss-Wurm Interglacial.[9] A conclusive proof of the existence of Moustierian man during the warm period between the Riss and Wurm is afforded by the cavern of Wildkirchli, Santis, which is at an altitude of 5,000 feet. During both the Riss and the Wurm Ice Ages this cavern must have been inaccessible to mankind, so that there is every reason to think that man lived there during the Riss-Wurm Interglacial. Along with Moustierian tools were found the bones of cave bear, cave lion, leopard, wolf, stag, and chamois. For fuller evidence on this point, the reader must be referred to the work of Penck and Bruckner, who show that the distribution of Moustierian finds coincides with the explanation which we have adopted. At Krapina also the animals belonged to the warm temperate companionship. Moustierian man lived apparently during the Riss (Denise and Olmo), also in the warm phase of the Riss-Wurm Interglacial (Moustier and Wildkirchli) and in the cold Steppe before and after the Wurm Ice Age, where we lose sight of him.[10] The English remains are, however, of special interest. Those at the Cotte de St. Owen and de St. Brelade have already been mentioned. The first seems to belong to the Riss Ice Age. In the St. Brelade period, however, Jersey was part of the Continent, and



THE GALLEY HILL MAN

Restored according to the directions of M. Rutot, Brussels

this would make the young man twenty to thirty years old, whose bones lay there a contemporary of the *warm phase* people of Moustieres-les-Amiens on the Somme. To the same phase seems to belong the cavern at Longcliffe.[11] The jaw from Kent's cavern is certainly a remnant of *Homo Neanderthalensis;* but as this famous place served as a refuge from the days of the sabre-tooth tiger until long after the Wurm, there is no evidence to show where it belongs.

The most difficult of the English finds are those of Galley Hill, Tilbury, and Bury St. Edmunds. The Galley Hill skeleton, discovered by Mr. Robert Elliot and described by Mr. Newton in 1895, was found in a gravel bed, 10 feet thick and 90 feet above the level of the valley. The obvious conclusion is that the man was drowned when the river flowed at this level; in the same gravel characteristic Chellean and Acheulean flints are said to have occurred. The skeleton was at a depth of 8 feet from the surface, and we do not see the slightest reason to doubt the testimony of those who saw it in place. The skull is by no means so rude and bestial-looking as that of the average Neanderthaler, but there certainly are Neanderthal characters. The extreme length and cephalic index of 64, the strong bony ridges over the eyebrows, the large size of the last molar tooth and the thickness of the skull (12 millimetres), are all very primitive or Neanderthaloid characters. M. Rutot looks upon him as a cross between the Neanderthal and the succeeding Cromagnon race.

The skull is said, however, to be much more highly developed than that of other Neanderthalers, and the eyebrow ridges are by no means so strong and heavy. Both the animals which occur in the gravel and the flint tools could perhaps best be explained as belonging to the Riss-Wurm Interglacial, but at a very early stage of it. That also would be the plain geological reading of the age of the gravels. It seems, then, that this very early Englishman differed from his Continental (Neanderthal) contem-

poraries solely in being a trifle more longheaded and large brained. There is no insuperable difficulty in believing this.[12] But as we hope to show in another chapter, he seems on the whole to be more nearly related to the Aurignacian. The Bury St. Edmunds skull found at Westley in a pocket of the chalk was at a level of some 100 feet above that of the River Lark at Fornham. Acheulean tools and a mammoth tooth have been found in similar pockets on the same hill. This skull is very imperfect, but seems to resemble that of Galley Hill.[13] So far as the evidence goes, it should belong to the same tribe.

The Tilbury skull found at 34 feet from the surface during the excavations for the docks is much more markedly Neanderthaloid than the two just mentioned. The eyebrow ridges are large and bony, but the chin is well formed. We have not found any exact description of the strata above the skeleton. There seems no reason against its belonging to the Riss-Wurm Interglacial, probably to the Middle or Warm phase. There is really no reason *now* to doubt the antiquity of any skull if it bears distinct evidence of Neanderthal characters.

We must now leave the Neanderthal man. What became of him? One school holds that he was a distinct species of mankind and died out. But M. Stolyhwo has produced skulls of recent man with well-marked Neanderthal characters. He has also examined and measured forty-nine anatomical characters and finds that in eighteen of these, *Homo neanderthalensis* lies within the limits of variation in recent man, that in twenty-six characters he is beyond or below, but still partly within this range. Only in five characters is he quite outside the limit of *H. sapiens*.[13]

This seems to show that he was not a separate species, and did not die out altogether; but that he was swamped by intercrossing with later invaders and that his descendants still exist in Europe (see p. 237).

MM. Boule and Anthony, in a very elaborate study of the brain of the Neanderthaler at La Chapelle aux

Saintes, show that his brain, though large, not indeed below the average of to-day, was simpler in type with less complex convolutions, smaller frontal lobes, and in many ways ape-like or rather intermediate.[14] He had advanced a very long way in the great ascent of humanity, but had not reached the level of the Aurignacian or of modern savages. On the hypothesis sketched above, that he was contemporary with the Aurignacians, an African or Italian people who entered France in the warm phase of the Riss-Wurm, then his influence on them would be of great importance. They were on a higher grade of evolution ; he had been exposed to a more strenuous selection, and was possibly more robust and adapted to a cold and inclement climate. If so, we have here the first of one of the most important agents in evolution, the mixture of two races of different cultures and of separate race-experience.

Even such a brain as MM. Boule and Anthony described would supply primitive vigour. It is, however, by the introduction of totally new habits of thought and methods that a very early tribe, though a little higher in scale, would profit by a cross with the ruder primitive stock.

[1] The Aurignacio-Magdalenian and Solutréan people who are represented in English caves are of quite a different type. The earlier River Drift man may or may not belong to the Moustierian. Many representatives of the Piltdown race may have lived on in England, but there is no proof of this.

[2] There is an extremely careful discussion in Duckworth, *loc. cit.*; also Klaatsch and Hauser, *Arch. f. Anthrop.*, 1908-09.

[3] Boule and Anthony, *L'Anthropologie*, 1911.

[4] In other parts of the world—as, for instance, the Grotte de Grimaldi—the changes in the climate are most clearly traced by the difference in the animals in one and the same cave. Probably the same changes took place in English caves. The methods of research have developed so greatly in recent years that views similar to those still upheld by Boyd Dawkins and formerly held in France have now been altered.

[5] Moller, *L'Anthropologie*, 1901.

[6] Marett, *Archæologia*, vol. 62, part ii.

[7] As Dr. Hauser, the well-known archæologist of Les Eyzies, puts it, a *liebevoller Theilnähme*.

[8] The name *Homo neanderthalensis* has the priority. He is often called also *H. primigenius*. The Jersey man (*H. Breladensis*, Marett)

and the Moustier man, *vide supra* (*H. moustierensis*, Hauser and Klaatsch) seem very similar to the Neanderthal type, and we have not attempted to distinguish between them.

[9] At Montières les Amiens, *Elephas antiquus*, *Rhinoceros Merckii*, hippopotamus, *Equus stenonsis*, red deer, lion, *Bos priscus*, and *Bos primigenius*. M. Commont seems inclined to think that the Acheuleans were a new people in Europe, but apparently connected with the Chellean and Moustierian folk. See Congrès Préhist., 1913.

[10] Messrs. Boule, Obermaier, and Breuil, do not accept this view. *Cf.* Compte Rendu Congrès Préhistorique, under Bayer.

[11] Bemrose and Newton, *Quart. Jour. Geol. Soc.*, 1905.

[12] Schwalbe seems to class Galley Hill with the Brux skull as intermediate between the Neanderthal race and modern man as *Homo sapiens*, var. *fossilis* (*L'Anthropologie*, 1906, p. 684).

[13] The height-index of the skull is a very rough measure of its grade of development. *H. Neanderthalensis* varies from 40 degrees to 47 degrees, Brux and Galley Hill about 48 degrees, and modern man 53 degrees to 64 degrees (Schwalbe, *L'Anthropologie*, 1906, p. 684; Stolyhwo, *Zeit. f. Ethn.*, 1912).

[14] *L'Anthropologie*, 1911.

CHAPTER X

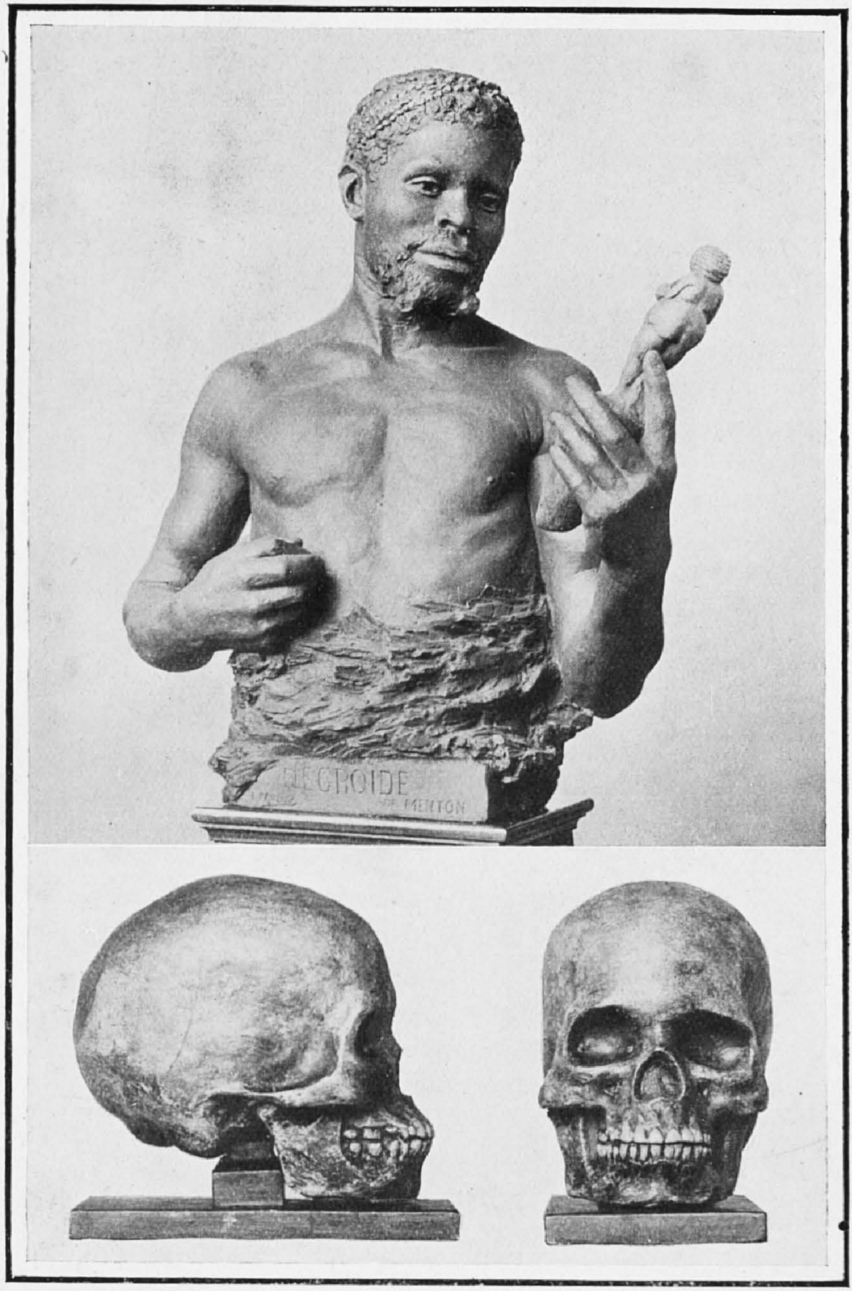
THE OLD MAN OF CROMAGNON

ALTHOUGH, as we have tried to show, the Neanderthalers may have survived until the Wurm Ice Age, other races had invaded Europe and succeeded in establishing themselves in France and elsewhere, at any rate during the warm phase of the Riss-Wurm Interglacial. Until recently it was supposed that there was but one race in Europe, and that this evolved passing through the Moustierian, Solutréan, and Magdalenian stages of culture. But this most simple explanation seems untenable. The most attractive working hypothesis just now is that put forward in a very cautious and tentative manner by M. l'Abbé Breuil. According to this suggestion, a new race of men, the Aurignacian, entered Europe probably by way of Tunis, Sicily, and Italy, over the land bridge traversed by hippopotami, elephants, and rhinoceros in the previous age.

They invaded France and established themselves, especially in the valley of the Vézère, as well as in and about the Pyrenees. The earliest settlements of these Aurignacians seem to have been at L'Abri Audi, Chatelperron, and in Tunis. Both in Italy and Spain they lived with the hippopotamus, *Elephas antiquus*, and Merck's rhinoceros, and it seems extremely probable that they entered France along with these animals in the warm phase of the Riss-Wurm Interglacial. This means that they entered at a time when the land was at about its maximum elevation. The sea may have retreated to the 100-fathom line. Yet the larger rivers, or, at any

rate, those flowing to the Atlantic, had kept open their valleys, digging them out and widening them, so that in Western Europe the warm fauna and a genial forest climate may have been continuous, by way of the Garonne and Somme, even to the Thames. In England, the great lakes formed by the damming up of those rivers which opened north and east, through glacial rubbish, and perhaps masses of ice, would by this time have been drained away; yet loam and brick-earth would be left as a sign of their existence. Over this a rich temperate forest would extend itself; so the Aurignacians, with the usual hippopotamus fauna, managed to reach Great Britain. Farther east in Europe, as we have already tried to show, the increased elevation of the land after the Riss had resulted in decreased rainfall and drought. Sandstorms and blizzards deposited the first of the ancient loess, and over these sand-filled valleys and Steppes Acheulean Neanderthalers hunted the woolly rhinoceros and the mammoth, the bison, and horse, as well as reindeer.

Yet even in Northern France, at the time of greatest elevation of the land, temperate forest existed in the middle of the Riss-Wurm Interglacial. But though at Willendorf and elsewhere there are signs of a temperate forest flora in the middle of the Riss-Wurm Interglacial, the characteristic elephant and rhinoceros do not seem to have always managed to establish themselves, the only sign of this temperate forest being that the red deer becomes abundant and the reindeer rare. But after the middle of the Riss-Wurm Interglacial, the climate began with the approach of the Wurm Ice Age to deteriorate steadily. The land subsided again, though not to the same extent; rivers began to fill up their valleys with deposits of gravel. But the subsidence was not great (only 100 to 135 feet in Scotland),[1] and over much of France and some parts of England Steppe conditions seem to have prevailed. The series of events



THE NEGROID OF GRIMALDI

A short race, perhaps the ancestors of the modern Bushmen, which once inhabited the Riviera
Restored according to the directions of Professor Rutot of Brussels by M. Mascré

is well shown in the sixty caverns found in the valleys of the Yonne and Cure.

They begin with the "corpulent" fauna of hippopotami and the warm companionship. Then follows the dry and colder climate of the later part of the ancient loess. With the Wurm Ice Age there is a much more humid and very cold climate. After this comes the dry, cold Steppe again, with abundant reindeer and the Magdalenian industry.

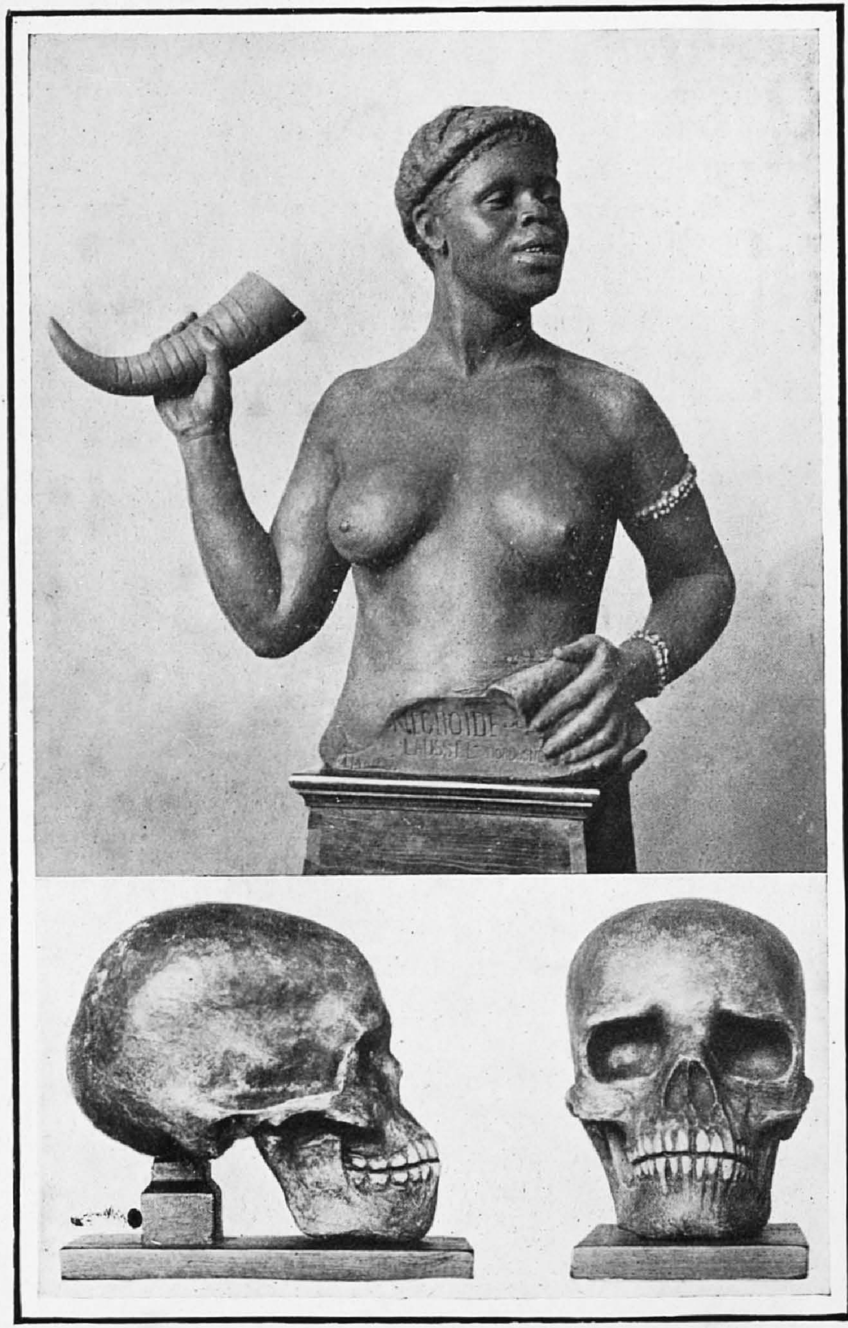
The Aurignacians found the Moustierian or Neanderthaler in France, and during all the changes sketched above, the former seem to have held their own in that country. After the Wurm Ice Age the Aurignacians modified their weapons and mode of life, and, after the theory which we have adopted, became the men of La Madeleine. These Aurignacians and their Magdalenian descendants pervaded all Central and Southern Europe. Their remains have also been discovered in Valetta (Malta), in Phœnicia (Nahr Antelias), and elsewhere, as we shall try to show later. But during this long period of time two other races also succeeded in entering France and Italy. These were a "negroid," perhaps pygmy, folk and the men of Solutré.

We have seen that the Aurignacian was originally an African, and if he traversed North Africa on his way from Egypt and Mesopotamia, it would have been a very remarkable fact if he had not come in contact with the African pygmy or his ancestors, for the Bushman, Wambattu, and the other pygmies are the oldest African race known to us.[2] The "negroids" discovered by Dr. Verneau in the Grotte du Grimaldi, though differing greatly from modern Bushmen, show that the Aurignacians were acquainted with a negroid stock, which may perhaps be assumed to be an ancestor of, or allied to, the pygmy. It is difficult to say exactly what was the relation between the Aurignacian and this "negroid" race.

The remains of the mother and son discovered in the Grotte des Enfants at Grimaldi were in the Hearth marked *I*—that is, above the Hearth *K*, which has characteristic Aurignacian flints, and below the skeleton found in Hearth *H*, which is a typical mid-Aurignacian. We find in the burial of the little negroid and his mother every sign of affectionate care, and the same reverent bestowal of the dead that characterized the graves of the Moustier man already described, and those of the Cromagnon race.

Even in details there is a very strong resemblance to these last (see below). The "negroid" boy, fifteen to seventeen years old, was buried in a more or less contracted position with his right arm round the woman's femur. Her right arm was round his neck. Their heights have been estimated at 1,540 and 1,580 millimetres. The bones were slender and graceful. The nose was broad and sunk in at the root. They were long-headed (69·27 woman, and 68·58 boy). The jaws were strongly prognathic. The chin was not at all prominent. The teeth are said to closely resemble those of the modern Australians.[3]

Whoever they were, their grave goods were of the wealthiest and richest for their day and generation. Quantities of flint tools, scrapers, a pebble of serpentine, and two burins or engraving tools were disposed around them. The boy's face had been smeared with red ochre, which was apparently an invariable funeral custom in Aurignacian times. One cannot help an uneasy suspicion that the "mother" was a female slave, who had been sacrificed to attend upon her young master in the next world. Still this shows that a "negroid" was not without honour in the country of the Aurignacians. Moreover, since the discovery of this burial, characteristic skulls of the same negroid affinity have been found in Spain, in Brittany (of Neolithic date), at Sierra (not earlier than the thirteenth century), in Sardinia, at Ostorf, and perhaps in Caithness.[4]



THE SHORT NEGROID WOMAN DISCOVERED AT LAUSSEL

Restored according to the directions of M. Rutot, Brussels, by M. Mascré

This would seem to suggest that there may have been a tincture of pygmy blood in the race of Cromagnon, which, of course, is highly probable if the original Aurignacian came from Africa. There are certain other points which tend to show that the people of Cromagnon were interested in pygmies. Statuettes showing the steatopygy and other sexual characters of the modern Bushmen have been discovered in the French caverns.[5] But that is not all, for, as we shall see in another chapter, the extraordinary artistic taste and a certain sense of humour in the drawing of animals are found only in the Cromagnon people (Madelenian) and in the South African Bushman. Both were also musical in a small and barbarous way. It is also possible that the Magdalenian poisoned his arrows, which is still habitual with the pygmy races. All these points together seem to increase the probability of there having been pygmy (in the sense given above) companions amongst the Aurignacians.

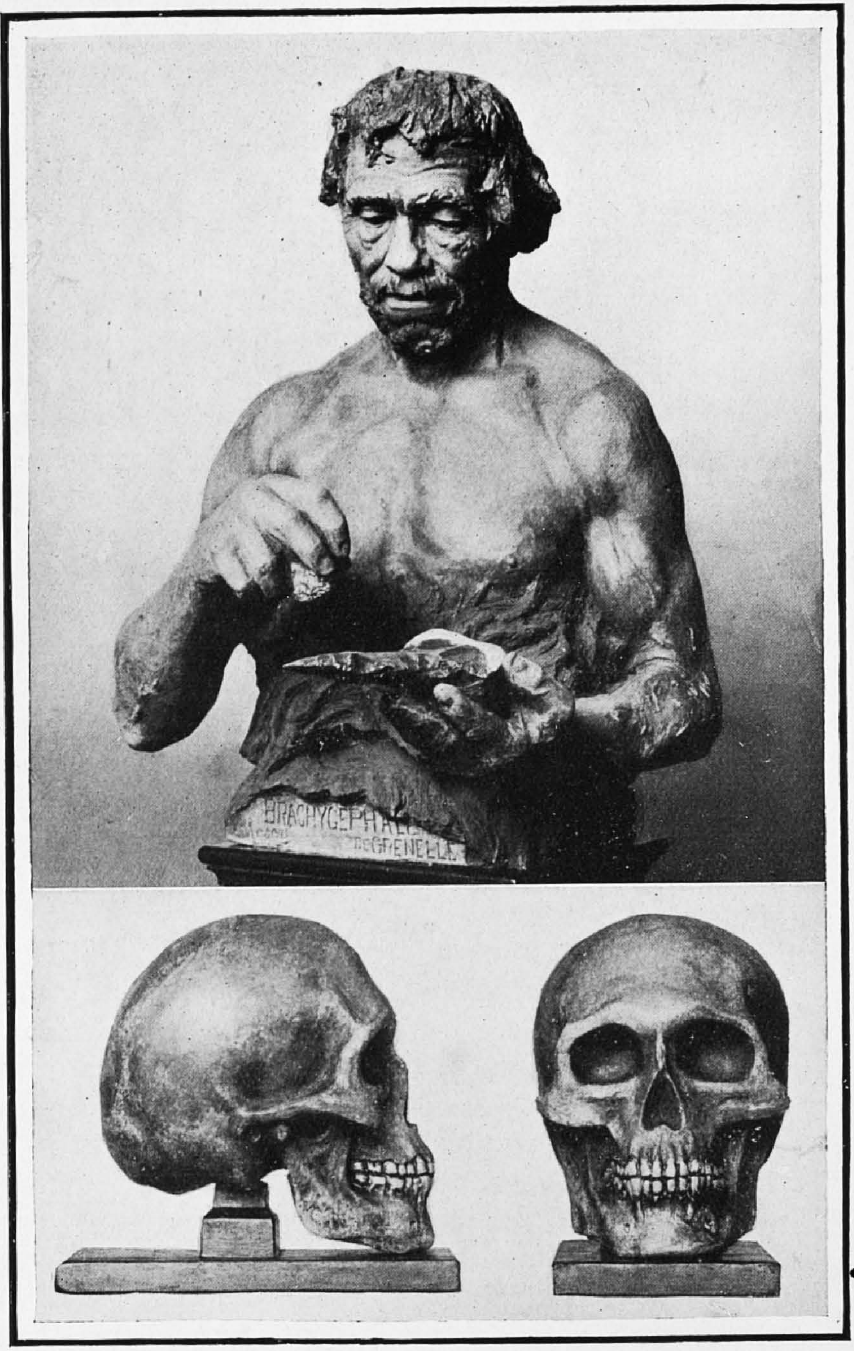
The other race which requires mention here are the men of Solutré, famous for their exquisite laurel-leaf flint spearheads, which are perhaps the very finest examples of artistic stonework ever fashioned by man. They seem to have entered Europe from the East, probably along with the Steppe animals, especially the horse of Prjevalski. They did not use bone instruments to the extent and with the skill exhibited by the Aurignacians.

Characteristic Solutréan flints are specially abundant in East Central Europe. They seem to have occupied the Dordogne, skirted round the Pyrenees and entered Spain, for they lived at Santander. Apparently they did not reach North Africa. In the little use they made of bone or of artistic decoration, and in their partiality for fine flint-work, they differ from the Aurignacian. No skeletons seem attributed with certainty to the men of Solutré; but we shall, as a working hypothesis, take them to belong to the earliest round-headed invaders of Europe,

perhaps coming by the route regularly followed for thousands of years afterwards by similar brachycephalous people. The skulls of Furfooz, Grenelle, and Solutré, would belong, on this theory, to the Solutréan race (see Chapter XII. But by far the most interesting people in Europe at this time were the Aurignacians themselves. They were a fine people, large of brain and robust of body, able to appreciate the beauty of animal form, and they also seem to have believed in a life beyond the grave. Their heads are exceedingly long, or markedly dolichocephalic, with index ranging from 64·5 (Galley Hill), 65·7 (Combe Capelle), 66 (Brünn), 67 (Clichy), 70 (Solutré), 73·76 (Cromagnon), to 76·26 (Grimaldi). When any of these skulls is observed from the side, one is struck by the fine forehead, the beautiful sweeping curve of the upper part of the head, and by the strong chin and slight bony projection over the eyes. One is not surprised to find that their brains were of very considerable capacity. The old man of Cromagnon possessed 1,593 c.c. of brain space, and the Chancelade man 1,710 c.c.

When seen from the back, some of the skulls have an outline rather like a haystack with a short vertical roof but rounded, not pointed at the top.

The skulls are, however, thick, from 8 to 10 millimetres, instead of 5 to 6 millimetres, the usual thickness in modern man. Their faces were broad, but short from above downwards, with sometimes a pointed though strong chin. Their noses were large and not broad and flattened, rather narrow, with nostrils directed downwards. They were tall fine men, robust and muscular. Some of them were well over 6 feet in height, though others can hardly have been more than 5 feet 3 inches. Most anatomists who have studied these skulls have had in their minds the Neanderthal type, and have rather over-accentuated the differences of the men of Cromagnon from that race. Yet the Aurignacians, or men of Cromagnon, were a primitive people, as is shown by the thickness of the



THE MAN OF FURFOOZ OR GRENELLE

The first brachycephalic invaders of Europe as restored by M. Mascré under the directions of Professor Rutot of Brussels

skull, by the brow ridges, and also by the internal markings of the cranium, which seem to imply a brain much less complex than that of modern man. The teeth are also primitive. The old man of Cromagnon, though forty to fifty years of age, had all his thirty-two teeth without a trace of disease. They are much worn, though healthy and sound, but they are very large, with the wisdom tooth only a little smaller than the rest. The lower jaw is also narrow, which is a primitive character.

The bones are well developed, but, except to an anatomist, hardly call for further remark. As one would expect in so artistic a race, the hand seems to have been finely modelled and small. In 1858 MM. Lartet and Christy discovered the old man of Cromagnon, with two of his fellow-tribesmen and his wife and child, in a rock shelter close to the present village of Les Eyzies. It was the description of this robust savage that, about thirty years ago, first interested the author in the story of prehistoric man. But it was not until 1913 that the long-cherished wish to make a pilgrimage to his resting-place could be managed. The visit was not a success. Part of the rock-shelter was filled with wine barrels, and the actual place where he lay is now the stable of a particularly morose and misanthropic mule, which refused to allow me to inspect the spot where the old man was so reverently interred some 18,000 years ago.

But we must now try to give some idea of the wide range of territory of which this energetic people were possessed. We are obliged to treat as a single race the whole series of generations, beginning with the inferior Aurignacians and ending with the last of the Magdalenians, for without numerous figures and more space than can be afforded we cannot differentiate between them. They lived in Europe from the warm phase of the Riss-Wurm Interglacial right through the ancient loess Steppe period, through the Wurm or last Ice Age and the succeeding younger loess or newer Steppe, until the Bühl, when,

at any rate, most of them, withdrew to the north-east, following the Steppe animals. The most famous localities are as follows: in Italy, the Grottes de Grimaldi, Cucigliana, Gabrovizza, Romanelli, and Golimo.[6] In Spain, the Grotto of Castillo, near Santander, which contains a nearly complete series; also the famous cavern of Altamira, and many others.

In or near the Pyrenees, there are numerous magnificent grottoes and long winding caverns, which formed the National Galleries of Madelenian man, and in the valley of the Vézère, and through the Dordogne, there are numerous rock shelters, caves, or camping-grounds.[7] Some sixty localities are given in Dr. Hauser's *Le Périgord Préhistorique* alone, and in the valleys of the Yonne and Cure no less than sixty caves have yielded remains belonging to this period. This means that he probably overran almost the whole of France. The man of La Motte in Jersey also probably belonged to this race, and in England the Galley Hill and Bury St. Edmunds men seem to belong to the same race, but with a cross of Neanderthaler. M. l'Abbé Breuil has shown that Upper Aurignacian man lived in Paviland cave near Swansea, and at Bacon's Hole, as well as in the other famous British caves. In Belgium, Gayet, Hastières, Furfooz, etc., were inhabited by this people. In East Central Europe there are the classical spots of Schweizersbild, Kesslerloch, Munzingen, Sirgenstein; and also Brünn, Ofnet, Neustadt-sur-la-Haardt, Willendorf, etc. Of special interest are the Russian discoveries almost on the southern border of the space covered by the ice sheet at its maximum period of extension, such as those at Kiev, Mèzine, Kostenki, Hontzi, and La Nouvelle Alexandrie.[8] In Siberia, Krasnoiarsk on the Yenisei has yielded remains of Magdalenian man and of the mammoth and woolly rhinoceros. So that from Phœnicia and Tunis[9] (to which probably Malta must be added, as six skulls of Chancelade type occur in the Valetta Museum) he seems to have passed through Italy,

France, and Spain to Belgium and England. He probably occupied all suitable places in England as far as the south of Yorkshire on the north and Swansea on the west. They were essentially hunters of big game; it is only towards the end of the Magdalenian that fishing seems to have become at all an important industry. The animals which they preferred were at first the mammoth and woolly rhinoceros, later on the horse and the bison, and at another period the reindeer; and they probably studied them with great care, and understood their ways thoroughly. We think that they probably followed the great herds of bison, horses, or reindeer, in their annual migrations, just as the Red Indians used to do. In fine weather they may have wandered over the prairies, for the Steppes seem to have resembled closely those of the American prairies in our own time. They would no doubt put up rough shelters of branches and grass, or perhaps sleep round a camp-fire. In winter or in the severe climate of the Wurm Ice Age, they would retire to rock shelters, often protected by a barrier of stones, or to the numerous caves and caverns characteristic of a limestone country. Always a fire would be kept burning in the entrance of such caverns, for the traces of bears show that this animal liked just those caves which man would prefer for himself. Some of these caverns—as, *e.g.*, Combarelles—would be extremely comfortable homes, for the temperature hardly varies at all during the year. They had iron pyrites and flint for striking a light, and seem to have used lamps of a primitive kind when in the caves. These are of soft stone or chalk, hollowed out, and probably contained grease or fat, and a wick of rush or other fibre. The Eskimo use quite a similar kind of lamp, but the type lasted for a very long time. The Neolithic lamp of the flint mines, those found in Scotch brochs, and even the catacomb lamps of Rome, are practically of the same pattern.

Their weapons consisted of spears, javelins or assegai, bow and arrows, clubs, and knobkerries. At first spears

and javelins seem to have been provided with flint heads more or less oval in section. Later on they used the curious *pointe à cran*. The narrow tang-like part of this could be easily tied on to the spearshaft, and the barb on one side would tend to prevent the spear or arrow from being shaken out of the wound. For the making, and especially the rounding off and straightening, of their arrow and spear shafts, they possessed a whole series of ingenious tools. Thus the *lames à encoches*, which have semicircular notches chipped out of the flint, would be an excellent tool for rounding the shaft. The so-called *bâton de commandement*, which is a piece of ivory or reindeer-antler bored with one or two holes, would be used to straighten and trim the spear or arrow; the modern Eskimo used to pass their spears and arrows through quite similar holes made in wood or ivory.

They would bore these holes by means of the *pointes* or burins of flint. The latter, which was also an engraving tool, is often beautifully finished.

MM. Breuil and Cartailhac have discovered in Spain a whole series of rock-paintings, showing the hunter actually engaged in his business.[10] No less than seventy representations of man have been found. These belong to the Magdalenian period, but appear to have been made by another race (see p. 178). We mention them here because the men carry bows, and also their arrows resemble those drawn in some of the Magdalenian caves.

Lance and arrow heads were often made of bone or of ivory, and are neatly fashioned and beautifully rounded. It is thought that they used water, sand, and stone to polish these tools. Such an Aurignacian would hunt sometimes by himself, sometimes in company. With certain small flutes and whistles, made of bone, and which are relatively common, he could keep in touch with his friends. Perhaps also he could use these whistles as bird-calls. If hunting alone, he would no doubt watch the watering-places, hiding himself carefully. Perhaps by a

THE VALLEY OF THE VÉZÈRE

This is the centre of the famous localities for prehistoric remains in France. The rock shelter of Cromagnon was in the village of Les Eyzies beyond the Bridge

The women were photographed at this village, and the central figure has traits which resemble those of the old man of Cromagnon

From the Author's photographs

lucky chance he could manage to crawl up through the long grass within reach of a horse or bison, and spear it. This seems to be the subject selected by one prehistoric artist. This hunter is drawn without clothes, and has his hair tied together with a band.

A very interesting point has been fully discussed by the late M. Piette, who believed that at one stage they had half tamed the wild horse, and had invented a sort of halter. His illustrations certainly show lines round the nostril and the neck, which look like halters. Other markings have been supposed to represent rude harness of some kind. But this, in spite of the high authority of M. Piette, seems to be doubtful.

The Champas of Thibet, according to Rockhill, used, in 1893, to catch the wild horse (apparently the same species, *E. Prjevalskii*), in snares of much the same kind as the ordinary small rabbit type used in this country.

Holes were made in their tracks near the watercourses. In these a rope ring was arranged which had on its inside small sharp splinters of wood or horn. The other end of the rope was tied to a stout peg driven into the ground. The Champa hunter concealed himself a little way off, and speared any horse which had put its foot into the snare before it could escape. But the Aurignacians would seem, from the drawings, to have caught the animal by the nose or round the neck. Professor Ewart states that Prjevalski's horse seems to be untamable, and has, so far as is known, never been domesticated by mankind. Yet the way in which both the men of Solutré lived on the horse and the manner in which the La Madeleine people used the reindeer is not very far off the great stage in advance, that of domesticating animals. This subject will be referred to later, but it is clear that these people knew their respective horse, bison, and reindeer thoroughly, and this is but a stage before domestication.

Before leaving their weapons, we must mention the spear-thrower. This instrument is a short, slender piece

of bone, with a nick at the end. When the spear-butt is placed in this nick, it is still possible to take as accurate an aim as with the hand alone; but, as the reader will find if he tries the experiment himself, a very much great propelling power is possible. Probably this is because a longer lever is brought into action. The savage who invented this improvement was by no means a foolish person. The distribution of this invention is of great interest. Spear-throwers occur amongst the Eskimos; they are represented in pictures of the Mayas, Incas, and Columbians in Central and South America, and they also occur among the Bakairi in Central Brazil.[11] Some New

FIG. 12.

The use of spear-throwers by living people in New Guinea is distinctly shown in this native drawing.

(Author, *Romance of Savage Life*.)

Guinea and Australian natives also use the spear-thrower. But this is but one of the many tools of bone which gradually make their appearance during the evolution of the Aurignac into the Magdalenian. The curious conical-headed pegs found in some Magdalenian deposits are apparently identical with the similar ivory tools used by the Eskimo to-day. Even more interesting are the various stages of the evolution of the hook, line, and rod, which we will now try to describe.

Early in the Aurignacian, one finds a simple bone spear or lance head, apparently tied on to the shaft with thongs of skin or perhaps sinews. Then some prehistoric genius originated the idea of notching the side of the lance head

with little points directed backwards. Such a lance head would stick in the wound. As the ages roll on, and the Aurignacian culminates and turns into the Magdalenian, doubtless in consequence of the stimulus of the cold of the Wurm Ice, and of hunger arising from the scarcity of animals, many improvements appear in this weapon.

The base of it becomes pointed, and has a ring-like or bulb-like thickening, which will obviously allow it to be fastened to the wooden shaft by a thin strip of hide, or perhaps of sinew. The points became larger, more beautifully recurved, and more distant. At first they are on one side only, but there are eventually some four or five on *both sides.* This little bone instrument (it is from 4 to 7 inches long usually), is one of the most ingenious tools ever contrived by man. The manner in which they used it is quite clear from other quite similar little harpoons, which are still used in savage life. The original type had one disadvantage. When an animal was speared, the shaft sticking in the wound would almost certainly drop out by its own weight or by catching in branches. But in the later form the short head is tied to the shaft by a line (reim of hide or sinew) perhaps 6 feet long; in this case the shaft is dragged after the animal, leaving a trail impossible to mistake, or if it is a salmon or seal, the shaft floats on the water, and is easily detected. This same type of harpoon is still used by the Eskimo for seal, by the Andamanese for spearing turtle; the negrittoes of Zambales have also arrows with detachable points,[12] similar harpoons are used by the American Indians (north-west coast), Ainos, Kurile Islanders, and Yahgans in Fuegia. Polybius (Scyllæum) describes an exactly similar method of fishing for swordfish as in use during his day in the Mediterranean — that is, from 135 to 50 B.C.[13]

But we must carry on the invention of these Cromagnon tribes to a still more interesting stage. Antiquarians

have been puzzled by certain tiny harpoons in which the barbs point the wrong way. In the final form these become a tiny "merry-thought" of ivory or bone. M. Breuil, with his usual acumen, has solved this mystery. These are fish-hooks attached as shown in the annexed figure. In Egypt a still further step in advance had been taken, for there is a line running down the shaft of the

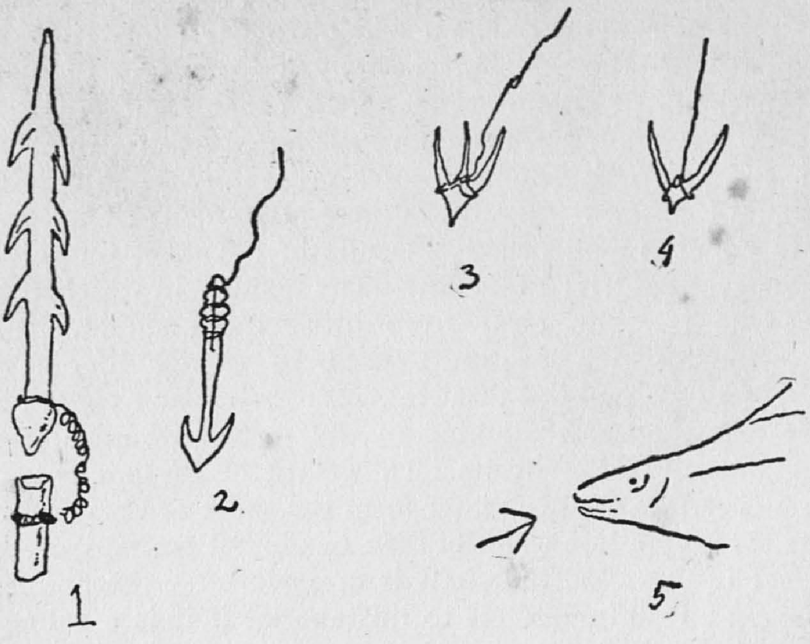


FIG. 13.—EVOLUTION OF THE HOOK AND LINE.

1, A typical harpoon of Magdalenian period; 2, a small bone harpoon used as a hook; 3 and 4, bone implements used as hooks according to the suggestions of M. Breuil; 5, prehistoric sketch of fish approaching hook (after Breuil).

harpoon and in the hand, the great king holds the very first of all reels. So the hippopotamus receiving all these barbed spears with the lines attached may dive as much as he likes. Even if killed so that his body sinks (not to rise, in course of nature, until twenty-four hours have passed), these lines would enable the Egyptian slaves to recover his body at once. The end, therefore, of these

ingenious contrivances which began in Early Aurignacian times is what has been rudely described as a worm at one end and a fool at the other—namely, the salmon and trout rod which we use to-day. One little point should be perhaps mentioned. There are curious grooves in some of these harpoon and lance heads which may be decorative, and also hollows under the barbs which seem unnecessary. But it has been suggested that these are intended for poison. They do resemble similar poison grooves used by Bushmen and Wambattu pygmies, so that this suggestion is quite probable. Poisoned weapons are characteristic of most, if not all, pygmy tribes.

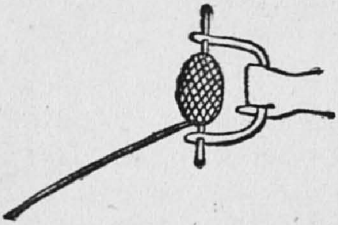


FIG. 14.—REEL USED IN ANCIENT EGYPT.
(Author, *Romance of Savage Life.*)

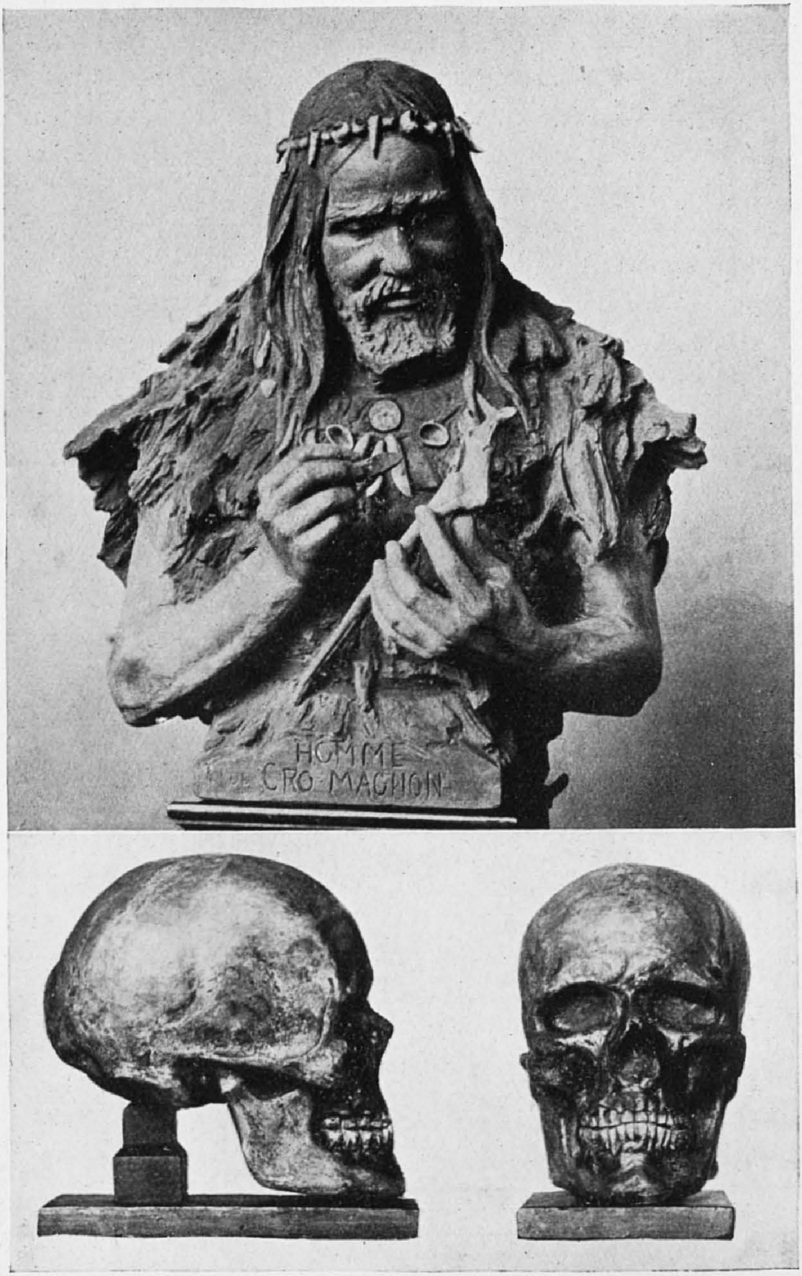
We hardly think that the boomerang of Australia was used by the men of Cromagnon. This doubtful-minded and finicky instrument was employed in very ancient times in Egypt, in East Africa, by the Kolarians in India, and has been found also at Aarhus, Jutland, and in the Danish peat-mosses.[14] What we have given above is not at all an adequate account of the well-furnished armoury of the Aurignacians and their successors. Once they had discovered the use of ivory and bone, it is but natural that they should give up flint instruments except for a very few necessary purposes.

The bone and ivory tools are so much more rapidly made. M. Flurin, who had no previous experience in the art, made a bone dagger in two hours, fifteen minutes,

and a good needle in forty-five minutes. These bone needles are characteristic of the Aurignacian, and seem to prove that they dressed themselves in skins and in fur. That this was the case seems all the more probable from the great variety of scrapers and rubbers found in their refuse heaps. They would be required to clean the skins from fat and muscle and to make them supple. Flint knives are also found, and were used, no doubt, for all sorts of purposes, and even flint saws with teeth carefully made. The bone needle has, in many cases, a carefully drilled hole, made probably with a revolving burin or point. Others of a larger type have the base split or forked. It is not altogether easy to see how exactly these latter were used, but perhaps a loop of the sinew was passed over the tip of the bodkin and the two ends run through the slit. From the amount of scrapers, knives, needles, and the like, it seems probable that the women of Aurignacian times had by no means a slothful existence. The meat was probably grilled over the fire, or perhaps boiled. After the Wurm Ice Age the use of fish as food becomes more marked, and then the Magdalenian gives place to the Azilian.

They were in their best times in the habit of adorning themselves with necklaces of shells and of teeth, sometimes of bone or ivory. That they took an intelligent interest in the world is shown by the discovery of fossils amongst their effects. They were also, as we shall show in Chapter XVIII., a people of real artistic sensibility, and not, we think, without a sense of humour.

It is hardly necessary to say that at this early age it was the men who required adornment and carried this rich or rare jewellery. M. Breuil describes an ornamental spatula which may have been used for tattooing. We think these considerations show that the Aurignacian was no mere fierce and solitary hunter avoiding his fellow-men. At this period, we think that men lived in small tribes, perhaps six or seven families together, just as the least



THE OLD MAN OF CROMAGNON

Representative of a race which is still to be distinguished in many parts of Europe
Restored according to the direction of Professor Rutot of Brussels

advanced Eskimo do in our own times. There would be no special amusement in a man wearing a necklace if there was nobody to admire it. The burials of these people show the same evidence of reverence and affection that we have noticed in the case of the Grimaldi negroids, and even of the man of Moustier. The man of Combe Capelle was placed in a carefully prepared grave. Some thousand flakes of flint and 187 good artefacts were arranged about him.

Not only were bones of the Urus and of some small animals placed near him, but he had knives and scrapers with which he could cut them up. There was also a piece of charcoal, probably for him to roast his meat with, or it may be that they thought the dead man might be cold. As ornaments he had a necklace of mussel-shells, and a piece of the enamel of a Urus tooth, and also Jasper instruments. His head or face seems to have been smeared with natural ochre, which becomes rich red in process of time by the formation of iron peroxide. It is likely that they always used ochre to paint the face of the dead, for this same substance was found in the graves of Grimaldi, Munzingen, and elsewhere. Nor was this custom confined to the Aurignacians, for it is found in burials of Neolithic Age both of the early and later times, as at Kiev, Poltava, Azof, and in the Russian Kurgans. The man of Brünn (placed in this age by Klaatsch) had a necklace of fossil-shells (Dentalium), a bored mammoth tooth, and a small piece of the rib of the woolly rhinoceros.[15]

Yet though the plain meaning of these customs seems to be that the Aurignacians were capable of affection and veneration, there is one circumstance showing that they may have been a little difficult in temper. One of the women in the Cromagnon shelter had been hit on the head with a stone axe which had pierced her skull. Being strong and vigorous, she seems to have survived the blow. Was this incident a necessary preliminary to a happy marriage, as in

Australia, or was there even then a feminist question? What became of this energetic and vigorous people? As a whole race, it vanishes from Europe along with the reindeer and the horse. This would obviously be the natural course of events if they were specialists in the art of hunting those particular species. It is worth while trying to trace these animals out of Europe, as this throws some light on the later history of the men of Cromagnon or Aurignacians.

Both the mammoth and its inseparable friend the woolly rhinoceros, travelled north-east right across Asia and into Alaska. Prjevalsky's horse, the Kiang, and the Saiga antelope also went in the same direction, but are now living in the Asiatic Steppes only. The reindeer of the Magdalenian resembles that of the Arctic tundra to-day, which differs both from the Scandinavian reindeer and the caribou of North America. The bison reached America and travelled south into the forest and prairie of the United States. This animal is not purely a forest or purely a Steppe form, but migrates between the two. The bison still has European descendants in Lithuania.

The elk which once visited the Thames, Essex, and Scotland survived in Switzerland until Neolithic and perhaps Celtic times. It still exists in Scandinavia, Poland, Russia, and Lithuania, as well as in Siberia and Tartary. Now, this would make it probable that some at least of the later Aurignacians (Magdalenians) reached America, where Eskimos, with so many similar instruments, still hunt the reindeer. The Magdalenians did, in fact, get as far as the River Yenisei. But one is apt to forget the time element in these inquiries. This journey across the whole width of the Old World was not taken through uninhabited country. The men of Solutré prove that even in the Wurm period there was somewhere in Asia a centre of emigration from which brachycephalic people were coming westward.

On their right flank during the whole of this journey

they would be in contact with brachycephalous Asiatics, who, moreover, lived in a more genial climate and on a more fertile soil than the Aurignacians had ever known. So we could not possibly expect a race with quite similar character to be living in America to-day. The people who live in the far north of the Old World have been closely studied by Mme. Jochelson Brodsky.[16] The following table gives some of their characteristics:

	Average Height.		Male Cephalic Index.
	Men.	Women.	
Lapps	1,529-59	—	84·0
Samoyeds			83·95
Tschukschi	1,622	1,522	82·0
Kamschatkales	1,601	1,496	78·5
Tungus	1,565-88	1,465-82	78·7
Eskimo, Asiatic	1,623	1,518	80·8
" Alaska	1,658	1,551	79·02
" East coast	1,575	1,480	71·03

These results show that the Eskimo vary greatly both in head-index and in stature, resembling on the one hand the Asiatic brachycephalic people who are or were nearest them, and on the other the race of Cromagnon, or Aurignacians.

Nor is this all, for one of the most characteristic points of one Aurignacian skull (Combe Capelle) is shown by Sergi to exist in the modern Eskimo—that is, the curious "haystack" appearance when seen from behind. So much has been said of the so-called "hiatus" between Palæolithic and Neolithic that it requires courage to say that it never existed, which is our own private opinion.

The facts seem to have been that the Neolithic people moved in tribes and established themselves in villages. There would be occasional contact between them and the few savages who lived on in Europe chiefly on fish and an occasional red deer. But one would not expect any *con-*

tinuity between races of such utterly different habits. Yet there is a similarity of the Cromagnon to some Neolithic skulls. In seasons of scarcity, they might easily become slaves of the Neolithic villagers, but their numbers would be quite insignificant as compared with the settled agricultural people, and such traces as they left would at the best be difficult to detect.

The period which we have been obliged to cover in this chapter is perhaps the most interesting in the whole history of man.

We begin with Neanderthalers and very inferior Aurignacians, accustomed to a warm climate and an abundance of food. But during the vicissitudes of the Riss-Wurm Interglacial, not only were these two races mixed up, but there were changes of climate and of food, perhaps also competition from Solutréans and Negroids. At the end of this period, the more or less mixed race not only had lived through the Wurm, but seem to have developed enormously in all the arts of life. They were still savages, but a very superior type, as we think we shall be able to show in a later chapter, see p. 277.

Since writing the above, a whole series of rock paintings have recently been discovered by M. Serrano in the south of Spain.[17] These are of the greatest possible interest, for there are no less than seventy representing the people themselves. They are shown carrying bows and arrows. The men sometimes had an odd head-dress, with two horns, or perhaps feathers. The body is, as drawn, excessively long, and the legs very short. A peculiarity is that most of the men wear a ring round the calf of the leg or ankle. Besides men, red deer, wild ox, horse, goats, wolves or dogs, moose, etc., appear in the drawings, which are decidedly vigorous and life-like.

These drawings at Alpera, Cogul, Calapata, and Teruel are, according to M. Breuil, of Magdalenian age, but the people are not the same as those of the south of France in the Magdalenian. We have only seen a very short

account of these discoveries, but these people were perhaps the descendants of the "negroids" of Grimaldi, or an African hunting tribe, perhaps one of the very earliest Hamites in Africa; until more is known about them, it is impossible to give a satisfactory opinion.

[1] We suppose that this corresponds to the Low Terrace of the Somme and the *berges du grand fossé fleuve manche* of M. Commont (Congrès Préhist., 1913), the young or Aurignacian loess of Bayer, and the Flandrian advance of the sea of Rutot (Bull. S. Belge Geol., 1913).

[2] It is possible that the Chellean weapons described by Peringuey, Johnson, and others, belonged to an even older race than the Bushman, but no trace of it is known to the writer.

[3] Gaudry, *L'Anthropologie*, 1903.

[4] Duckworth, *Arch. f. Morph. u. Anthrop.*, 1911.

[5] The same bodily characters have been recognized in Egypt (Early Neolithic), in Somaliland, about 1500 B.C., and in modern South Africa.

[6] *Cf.* Mochi, *loc. cit.*, who gives the age of each Italian deposit, and also table on p. 120.

[7] Amongst the best known are Marsoulas, Bruniquel, Gourdan, Lorthet, Tarté, Gargas, Combarelles, Font de Gaume, La Mouthe, Les Eyzies, Audi, Catelperron, the three Laugeries, La Micogne, La Madeleine, Combe Capelle, Placard Aurensan, Chaleux, St. Marcel Indre, Les Hoteaux, Duruthy, Arcelin, etc.

[8] Volkov, Congrès Préhist. (Fourteenth), Geneva, 1912.

[9] Characteristic Aurignacian implements are said to occur near Prieska and Embabaan in South Africa.

[10] *L'Anthropologie*, 1912.

[11] Von den Steinen, *Unter. d. Naturvolk. Zentral Brazil*, 1894.

[12] Reed, *Ethn. Survey Manilla*, vol. ii., part 1.

[13] Tozer, *History of Geography*, 1897.

[14] Thomsen and Lassen, *L'Anthropologie*, 1906.

[15] Klaatsch and Hauser, *Præhist. Zeit.*, 1910.

[16] *Arch. f. Anthrop.*, 1906.

[17] Breuil and Obermaier, *L'Anthropologie*, 1912.

CHAPTER XI

PYGMIES

IN theory there is no real support for the belief that pygmies constitute a very early and a natural group, for they might just as well be stunted or starved forms of any kind of man. Bad or insufficient food, early mating, and a severe climate produces dwarfing not only in almost every kind of animal (from the pygmy hippopotamus to the oyster), but in plants also, and, according to Mendelian observers, dwarfing seems to be inherited; so that, as it is likely that the earliest or most primitive types of man were badly nourished or married very early in life, the mere fact that a race is short does not prove that it is a primitive one.[1] Formerly it was supposed that the first men were excessively tall. M. Henriot, in a paper read before the Académie des Inscriptions et Belles Lettres in 1718, made out by "irrefutable calculations" that Adam was 123 feet 9 inches, and Eve 118 feet 9 inches, in height. He gave a successively smaller stature to later celebrities, until he could allow 10 feet to Hercules, 6 feet to Alexander, and to the unfortunate Julius Cæsar a miserable 5 feet.[2]

But we think M. Henriot was wrong, for there is no real authority for supposing that the common ancestor was either excessively tall or remarkably short. But, as a matter of fact, the modern pygmy not only in physique, but in habitat does resemble in a very marked way what we may perhaps guess as being theoretically the first and least developed type of mankind. Not all the characteristics which follow can be traced in any one group or tribe of modern pygmies, but they seem to be commonly dis-

tributed amongst them: A relatively long head, from one-sixth to one-seventh the total stature; a small brain; a forehead rounded in the middle, which gives an infantile appearance ("front bombé"); upper jaw more or less distinctly projecting beyond the line of the forehead or prognathism; broad cheekbones; nose blunt and broad, with very wide-spread nostrils; bridge of the nose concave, and overhung by the eyebrow region; the chin is usually retreating, and often narrow; the curvature of the spine not so well marked as in ordinary races, and the stomach unusually protuberant; the feet adapted to climbing as well as to walking, and with a distinct interval between the big toe and the others, so that it is easy for the pygmy to use his foot as a hand.

The bones as a rule are slender or "gracile," and pygmies often mature at a very early period. There is nothing definite in the relative dimensions of the skull, though Stratz[3] (from whom these characteristics of "protomorph" races is taken) considers that the head is neither markedly long or short—that is, that it is usually mesaticephalic. Curiously enough, some of the African group are more or less long-headed, with woolly hair, whilst the Asiatic pygmies are often broad-headed, and one branch of them have wavy hair. Besides the short stature of the pygmy, they show, then, also a number of characteristics which recall man's ape-like ancestor. Other traits are certainly infantile.[4]

But the modern pygmies, with hardly any exception, are lone hunters of the tropical jungle. Many of them, in fact, live in the same districts as not only lemurs and anthropoid apes, but the "corpulent" fauna of elephants, rhinoceroses, and hippopotami, which, as we have seen, were the companions of the earliest races of man in Europe. Their districts are the least desirable or most out-of-the-way places of the earth. Men have left the pygmies alone in them, because such spots were not supposed worth occupation. If they were one of the earliest

and least advanced races of man, then they fulfil all possible conditions which could be asked of them, whether in physique, in culture, or in distribution. That they preceded other races in many parts of the world is also fairly well ascertained. There is, however, one exception to the distribution of pygmies, as here outlined.

As we have shown in the last chapters, the negroids of Grimaldi, who were surely allied to the African pygmy, seem to have been at least sometimes held in honour in Southern Europe. That they accompanied the Aurignacians is certain, but whether as slaves, undergame-keepers, or professional "devil-dodgers" we do not know. Traces of this African pygmy blood seem to persist in Europe to the present day. At Dachsenbühl, near Herblingen Schaffhausen, a race of tall men were living together with a very short people at the very beginning of the Neolithic Age. Similar people existed in French Neolithic times at the Grotte aux Fées (Seine et Oise), at Merceaux, in the Cevennes in the Magdalenian, perhaps at Les Hoteaux (1,350 millimetres in height), in lake dwellings at Moosseedorf, near Ergolswyler by Bâle, and elsewhere. Living people of this very short type were observed by Sergi and Mantia in Sicily. In Bohemia also it is said that in the "Schnurkeramik" period a type with negroid jaw, prominent cheekbones, and strong prognathism still existed.[5]

Pygmies are mentioned by Aristoteles, Homer, and Hesiod.[6] Moreover, the steatopygous statuettes found at Bruniquel in Aurignacian times seem to have persisted for a long period in the Mediterranean. They occur in Algeria, in Hal Safflieni in Malta, in the Grecian Archipelago, in Thrace, Roumania, and even in the Siebengebirge.[7] One idol even seems to have woolly hair. They are also said to have been found at Elam, dating to about 4,000 B.C., along with drawings of guinea-fowl, ostrich, etc.;[8] they occur in Egypt in Early Neolithic times, in Somaliland about 1,500 B.C., and the same peculiar for-

mation of the body exists to-day in the Bushman of South Africa.

It is by no means certain that the Bushman, or, more correctly, the pygmy, was the very first man in Africa, for the people who used Chellean tools have not been discovered; but it seems certain that he preceded all other living Africans. Besides, from "the interior of Libya beyond the marshy tracts of the Upper Nile," they were described

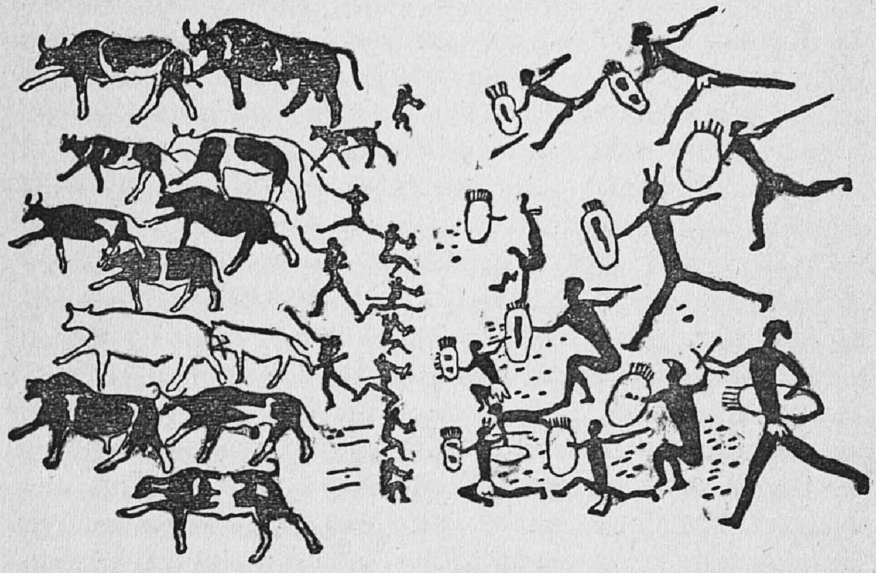


FIG. 15.—BUSHMAN DRAWING (AFTER R. ANDREE). THE BUSHMEN HAVE STOLEN SOME CATTLE FROM THE KAFIRS AND ARE DRIVING THEM OFF, THE KAFIRS IN PURSUIT.

(Author, *Romance of Savage Life.*)

by Battel in 1625 in Loango. Duppen mentions their small stature and large head. The Congo Forest pygmy seems certainly not to differ so much from the South African Bushmen as one is apt to suppose from the statements of certain authors. They have in not so marked a degree the steatopygy, prognathism and other important characters. The differences in the eyes, according to one writer, are due to a change in conditions. The small

zugekniffene eyes of the desert type seem at first very unlike the open, large, and "bolting" eyes of the Wambattu, Akka, and the rest, who live in dense and dark jungle,[9] but may be due to the altered environment.

Professor's Sollas's account of the African Bushmen is so thorough and complete that it is unnecessary for us to say more about this group.[10] We must, however, lay stress on two or three little points, of which the significance will appear later. They have, both in the forest and in the Kahahari Desert, an extraordinary knowledge of plants. They use poisons, both vegetable and animal, and it is not too much to say that they seem to have been the very first race to understand and realize the importance of botany. Then, also, they are clever artists and musicians of quite remarkable efficiency for a stage so primitive. Perhaps it was this insignificant people that invented the very first type of violin. A deep poetical and emotional nature exists in their small bodies. In a state of nature their pantomimic dances are kept up with extraordinary enthusiasm, and continue all night long; to their peculiar dances the wildest tango would seem as mild as Sir Roger de Coverley. We were not present when one of them danced at one of our great Universities and, if the report be true, electrified an anthropological assemblage of all that were most learned in that subject.

But besides this, if correct, quite astonishing feat there are ideas in their folk-lore and legends which are quite beautiful. "They listen to the music of the stars cursing the springbok's eyes." Jupiter is the heart of the Dawn. The Great Star, singing, named the other stars. "For they are girls whom the rain has taken away. They resemble flowers." "We make clouds when we die."[11]

In Asia there are two quite different kinds of pygmy. One of them retains the woolly or curled peppercorn hair of the African group, but is brachycephalic. The other has wavy hair, and differs also in other characters. To the first, or woolly-haired, division belong the Anda-

manese, the Semang of the Malay Peninsula, the Aeta and Negrittoes of Zambales (Philippine Islands), and the Tapiro, discovered by Captain Rawlings in British New Guinea. But there is a story of an aboriginal very small people living in caves or holes, and which had tails, as far east as Japan, as well as in China, Siam, Annam, and the Malay Peninsula. The same tradition about a little tailed man living in a cave is mentioned by Father Zeltner as occurring amongst the Wasulonké and Peulh, near Doro, in the African Soudan. All the Asiatic pygmies are shy, aboriginal, forest-living nomads, using poisoned arrows, and confined to the depths of the jungle or inaccessible and remote hills. Other more energetic and more advanced tribes have passed along the coast, and forced their way up the river valleys as far as canoes can go. In many of the Indo-Malayan islands there is not now any separate and distinct pygmy race, but traces of their presence can perhaps be detected by the occurrence of small dark people, with woolly hair and other pygmy features.[12]

Thus, in German New Guinea in 1905 or 1906 Pöch found a tribe of very small stature (1,525 millimetres average of fifty men and 1,435 millimetres of twelve women); two men were 1,330 and 1,350 millimetres only.[13] From this he suggested that there must have been a pygmy race somewhere in New Guinea. Captain Rawlings discovered the Tapiro pygmies in Dutch New Guinea shortly afterwards, and these we shall first describe. They have the characteristic flat wide nose, short woolly hair, and clean-built slender frame. So far as one can judge from photographs, they also have the rounded infantile forehead, the big toe separated from the rest, and, unless the photographs are more deceptive than usual, the vertical head length is one-sixth of the body length or thereby. They average 1,446 millimetres in height, but one was only 1,326 millimetres. They have fine arrow-heads, and the usual yellow pariah dog. They seem to use nooses to

snare animals, and carry a netted string bag, which may be, as we have seen, the very first bag of any kind.

They had flint knives, with which they scrape down the wood of their bows, and made Jews'-harps of bamboo, and simple carvings in wood. They also seem to be fond of personal ornament, wearing necklaces of wallaby teeth or beads, and caps of cassowary feathers and cuscus fur. But they have been affected by contact with other tribes, for they build houses on piles, some 6 to 8 feet from the ground; they also cultivate certain crops, and smoke cigarettes.

According to A. J. P. v. d. Broek, of Utrecht, Dr. A. C. de Koch discovered a pygmy folk in a village on the south flank of the Goliath Berg, which is to the east of the Tapiro country, on January 30, 1911, whereas Rawlings first met his pygmies early in March of the same year. So far as one can judge from photographs, these Goliath pygmies are more crossed with other native races, and are taller than the Tapiro; but they are obviously another branch of the same original stock. Several other localities are given, both in New Guinea itself and on some of the neighbouring islets.[14]

There is no mention of poison in the descriptions, but the arrows are tipped with a point of black wood.[15]

In the Philippines pygmies were described by Chirino in 1664, and, according to Zuniga, who wrote the Franciscan Chronicle in 1738, they were the first possessors of the islands. They have in Zambales the same short stature (averaging 4 feet 9 inches), woolly or kinky hair, spindly legs, prehensile big toe, round "negroid" eyes, and very flat broad nose.

They use finely woven vegetable fibre and bamboo baskets, and very beautifully made bows and arrows, which last have detachable points, tied by a long string to the shaft. They have the thorough knowledge of botany, which is one of the pygmy traits. If a fruit is thought to be poisonous, they will soak it for two or three days; then

give it to one of their dogs, and if he does not seem to be any the worse, they will eat it themselves. They seem to be expert hunters, fishing with arrows, and driving their game by dogs; they also snare birds. They are enthusiasts in dancing, and have an elaborate series of musical instruments, including the Jews'-harp, four-holed flute, three-stringed bamboo violin, rude guitar, and a gong. They are also fond of finery, wearing necklaces of seeds, stones, and bone or wood. In these respects they are decidedly above the level of many more advanced savages. They are also, *comparatively speaking*, temperate, truthful, and chaste, as well as being fond of their children.

After a successful hunt they cut part of the entrails into small pieces and scatter them saying, "Spirits, we thank you for this successful hunt. Here is your share of the spoils." These, like other pygmies, are now cultivators of the soil. According to Reed, remains of a similar underlying pygmy stratum can be traced in Luzon, Panay, Negros, Mindanao, Paraqua, Tablas, and Guimaras.[16] It is hardly necessary to describe the Andamanese[17] or the Semang of the Malay Peninsula, for they are quite well known. The latter are said to track a snake by its smell, and are quite extraordinarily expert hunters. When they have seen elephants ascending a hill, small parties of two or three will lie in wait armed with a splinter of bamboo, which has been hardened in the fire and tipped with poison.

The elephant comes down slowly, and the Semang steals up behind it; then, seizing his opportunity, drives his poisoned splinter into the sole of the elephant's foot. They are also said to kill the rhinoceros. Similar tiny strips of poisoned bamboo are placed in the jungle path frequented by game, and they are also exceedingly clever in the manufacture of snares, nooses, and traps. In this respect the jungle helps them, for it contains all sorts of creepers, some as elastic as a steel spring, others as tough

and flexible as the finest wire. In fact, these Semang, if half what is said of them is true, seem to explain much that is hard to understand in the life of the Aurignacians.[18] Commerson, during his stay in Madagascar, states that he saw a pygmy belonging to a race called "Quismosse or Kismosse" that then lived in the high mountainous districts. He saw one woman who had arms so long that, without bending, the hand could touch the knee-cap. She was bronze-coloured and not so dark as the other natives, and 3 feet 8 inches in height. Her hair was short and woolly. She was well proportioned otherwise, and was usually laughing.

The tribe to which she belonged kept cattle and lived in the higher mountain fastnesses. They were brave and independent, keeping off their enemies by spears and arrows, with which they were extremely expert. The Rev. E. O. Macmahon, S.P.G., heard the same report of a race of dwarfs called Behary, by the Sakalavas, and actually saw some of them, though they were too far off to distinguish them clearly.[19] M. A. Grandidier, however, discredits this account of Commerson, and states that there are no pygmies in Madagascar now. It seems, then, possible that there are, *or were*, pygmies in Madagascar, as well as in East Africa, the Andamans, New Guinea, Philippines, etc. Another very early group also left, like the pygmies, stranded in the most remote and undesirable tropical jungles is composed of the Veddahs of Ceylon, Toala of Celebes, Senoi of the Malay Peninsula and perhaps also of the Kubu (Sumatra), Uluaja (Borneo), Chuang and Yeruba (India), Hieng (Cambodia), Miaotse (South China). All these tribes, and even the Aino of Japan, have been claimed as of Veddah-pygmy affinity. In one character they differ entirely from the African and Asiatic pygmy. Their hair is wavy, not woolly or curly; they have often a considerable growth of beard, which is not so common with other Asiatic pygmies. The Veddah pygmies are, or were, shy, truthful, chaste jungle-dwellers,

who used to sleep in rock-shelters and caves, and succeeded in living on honey, grubs, bats, pythons, lizards, and an occasional larger animal. Their arrow and spear heads were made of quartz or andesite.

They have been spoiled, from a scientific point of view, both in Ceylon and Celebes, partly by the necessity which every nation feels of doing the best that it can for tourists, and partly by their having had the good sense to adopt a more agreeable diet even at the cost of a little trouble to themselves.

They are undoubtedly a very early twig of the Asiatic stock, for we find in them slight eyebrow ridges, the regular pygmy nose, and a short broad face. Their cephalic index varies (70 to 76 Veddahs, 80 to 84 Toala, 76 to 80 Senoi). The Toala have a rounded forehead, a similar short broad face rather narrowed at the chin, and a certain prognathism. They have a slight slender build, and formerly used the bow which is now almost extinct in Celebes. Amongst the effects of bygone Toalas dug up by the Sarrasins in the rock-shelters of a wild limestone jungle country in Southern Celebes were the string bags, stone knives—both double and single edged—bone arrowheads and others made from the tusks of the boar, bone whistles, and fossils. They used to wear, as mementoes, small pieces of the bones of their dead relatives. Perhaps it was for the same reason that the Veddahs once carried about a small piece of human liver.

The Veddahs had also ceremonial dances. Rock-drawings exist not only in Ceylon, but in Celebes and even in Borneo where the presence of this substratum has been doubted. If, when hunting, the Veddah happened to meet a bear, he would address him with great politeness and much ceremony: "O venerable one of noble family! O lord born in a hole of the rock! *Be off!*" The last two words being uttered in a blood-curdling shriek which would certainly startle any wild animal. From the above, the reader will at once perceive

how difficult it is to class these pygmy races. Though they differ in head-index and in character of the hair, yet in many other respects they seem to be very close to one another. Their mode of life is nearer that of the living anthropoid apes than in the case of any other group of mankind. They are, or were, mostly in the company of elephants, rhinoceroses, and hippopotami, as well as of the anthropoid apes.

One can but say, then, that they represent the earliest type of lone hunters of the jungle, who probably split off

FIG. 16.—A VEDDAH SHOOTING.

from the original stock whilst it was still in the meeting-place of continents; and that even in their archaic type, they had divided into the African type with woolly or curly hair, and the Asiatic with wavy and long hair and beard.[20] Yet even this primitive group contributed their share of invention to the progress of mankind. They were the first botanists and students of poison. They seem to have been the inventors of flutes, stringed instruments of music, and perhaps of the bow and arrow. One curious point about them is that they seem usually to have no peculiar language of their own, and adopt that

of the nearest tribes. The Bushmen speak a Hamitic language, probably borrowed from the Hottentot, with a few special ornaments of their own. Amongst these "the cerebral click is sounded by curling up the tip of the tongue against the roof of the palate, and withdrawing it suddenly and forcibly." There are eight clicks and "gentle croaking sounds in the throat," as well as a consonant between *r*, *n*, and *l*.[21]

Obviously they were wise in adopting any other language. One very interesting point is the question whether any kind of pygmy reached America. In South America we find that the use of curare and other poisons is quite common. Engraved pictures, arrowheads chipped from quartz or made of fish or human bones with the detachable device, necklaces of monkey teeth or rattling shells, throwing sticks, and dances often carried on with enthusiasm and accompanied by stamping on the ground, are all not uncommon in Central and South America. The women in the Chibcha stems marry at eleven to twelve years of age, and are only 1,350 millimetres in height. There is also a tradition of little hairy men 4 to 5 feet high, but very strong and wiry. Cave dwellings are quite common.

These similarities are consistent with an Aurignacian immigration into America in very early times, but can hardly be said to make it more than only possible that the Veddah pygmy managed to reach South or Central America. Against their ever having reached America is the fact that none of their usual companionship in the animal world ever entered that continent, and that the Yahgans of Fuegia are typically South American in appearance. Here and there also there are shy forest tribes in South America marrying only one wife, and of a quiet gentle disposition.[22] Many American tribes are excellent botanists, and even good herbalist doctors. Indeed, the very first botanic garden in which medical herbs were grown for the use of medical students and

their teachers seems to have been in Mexico.[23] On the whole, we cannot believe that the true pygmy ever reached America; some of those races which succeeded him and may have had pygmy blood seem to have done so. According to a recent author,[24] there is no doubt that the pygmies are moral, and have a quite definite knowledge of good and evil. They address prayers and offerings to a deity, who is naturally thought of as anthropomorphic. Though their morality is better than many races on a higher level, it is clear that their whole way of living is one in which there is a minimum of temptation.

[1] The growth of the body is said to be regulated by certain glands, but this does not really explain anything. Whatever affects growth acts through these glands (Keith, *Nature*, October, 1912).

[2] *L'Anthropologie*, 1905.

[3] Stratz, *Arch. f. Anthrop.*, 1903.

[4] If pygmies are the result of dwarfing due to early marriage, exposure, or bad food, we would expect them to have infantile characters.

[5] Reche, *Arch. f. Anthrop.*, 1908-09.

[6] McIver and Wilkin, *Man*, 1901, 62; Verneau, *L'Anthropologie*, 1902; Kollmann, see *L'Anthropologie*, 1904.

[7] Fischer, *Arch. f. Anthrop.*, 1908-09; McIver and Wilkin, *loc. cit.*; Bradley, *loc. cit.*

[8] Delisle, *L'Anthropologie*, 1902.

[9] Ankerman, *Arch. f. Anthrop.*, 1904, 5; Verneau, *L'Anthropologie*, 1905.

[10] Sollas, *Ancient Hunters*.

[11] Haddon, British Assoc., 1904; Verneau, *L'Anthropologie*, 1905. Mlanji, Sandawi, German East Africa, retain traces of Bushmen as well as the well-known Wambattu, Akka, etc. They are, we think, often to be traced in Bantu people, just as Beech found specimens amongst the Suk (Bleek and Lloyd, *Bushman Folklore*, 1911).

[12] Stratz, *Arch. f. Anthrop.*, 1903; Haddon, see Wollaston, *loc. cit.*; Kollmann, *Die Pygmæn.*

[13] Pöch, see *L'Anthropologie*, 1906, p. 201.

[14] Broek, *Zeit. f. Ethn.*, 1913, where the recent authorities are given.

[15] Rawlings, *New Guinea* and *Geo. Jour.*, September, 1911; Wollaston, *Pygmies and Papuans*, 1912.

[16] Reed, Eth. Surv. Publications, Manila, 1904, vol. ii., part. i.

[17] Man, *Andaman Islands*, 1883.

[18] Skeat and Blagden, *Pagan Races of the Malay Peninsula.*

[19] Oliver and Scott Elliot, *Life of Philibert Commerson*, 1909; Macmahon, *Antanarivo Annual*, 1891, vol. iv., part iii.

[20] See Sarrasin, *Versuch. o. Anthrop. Celebes*, 1906; *L'Anthropologie*, 1906; *Man*, 1908, 67. Fritzsch, *L'Anthropologie*, 1906, p. 595. Seligman, *Man*, 1908, 63, and *The Veddas*, 1911.

[21] Meinhof, *Arch. f. Anthrop.*, 1910; Bleek and Lloyd, *Bushman Folklore*, London, 1911.

[22] Von Den Steinen, *loc. cit.*; Spruce, *loc. cit.*; Rodway, *Guiana*, 1912.

[23] Raffour, *L'Anthropologie*, 1901.

[24] W. Schmidt, see *L'Anthropologie*, 1911.

CHAPTER XII

THE FIRST HERDSMEN

As we have already tried to show, the pygmy is still almost always a lonely hunter of the tropical forests; yet if our suppositions are right, he may have been an invaluable person, not only to the Aurignacians, but to humanity. His thorough knowledge of botany and o poisons, his love of art, music, and dancing, though they have not perceptibly influenced his own history, yet were great acquisitions to humanity, and probably affected every people with whom he has ever been in contact. The taming and subjection of wild animals was perhaps the next great advance in civilization. It is probable that almost all our domestic animals were first brought under human control in Asia.

During the whole period which we have been considering—that is, on our probationary time scale, for some 76,000 years—man had undoubtedly been living, varying, and developing in Asia under conditions which were in all probability far more favourable than those of his European contemporaries. In Asia we have already seen that there were two pygmy stocks; but in addition to these there have been, as far back as we can trace mankind, two other great races. One of them, the ancestor of the Mediterranean race (as well probably as of the Aurignacian), and also the ancestor of Jews and Arabs, is long-headed, or dolichocephalic. From our first home of mankind this type has migrated generally to the west along both sides of the Mediterranean, and sometimes east into India, but very rarely to the north. Another distinct and different variety

of man—a short-headed, or brachycephalous, type—is the usual inhabitant of all Asia north of the Caspian, as well as of China and Japan. It is often divided into two groups — the dark brachycephalous, or Alpine, and the yellow-skinned Mongolian; but these we shall assume are extreme varieties of an original type. It is people of this general character, brachycephalous and usually dark, who have inhabited the Steppes of Asia from the earliest periods. They are nomad herdsmen without any fixed home, living by their flocks and herds, and they make little use of agriculture, though they sometimes grow a crop of corn.

It seems probable that brachycephaly—that is, a round rather than long type of head—is of extremely ancient date. Even amongst the Neanderthalers, one skull, that of Krapina, is markedly round-headed (85·5 cephalic index). This place (North Croatia) lies on a tributary of the Drave in direct continuation of the great highway up the Danube, which was one of the regular routes of invasion from the east. Then there are the much-discussed skulls of Furfooz, Grenelle, and La Truchère. The last-mentioned, which was found in the bed of the Saône, is of peculiar interest. It has massive cheekbones, an index of 84·32, but was *prognathous* and with a long nose. All these three finds have been, even by recent authors, set aside as insufficiently recorded; but sometimes one suspects that they have been disregarded simply because it was inconvenient to believe that any round-headed man entered Europe before the newer Stone period.

It is said, for instance, that there was no way into Europe from the East until the close of the Glacial period, but surely this is quite unwarranted in view of the extraordinary changes of level during the Ice Ages.[1] If the wild ass, Prjevalsky's horse, and the Saiga antelope could reach Europe, why should their usual enemies be excluded? During the Riss-Wurm Interglacial especially, we do *not*

know the levels of the Black Sea and Caspian. Nor is that all, for there was a race of men in Europe, probably before the Wurm Ice Age, which seem to have come from the East. These, the men of Solutré, were remarkable for their extraordinary skill in the art of flint-working. Their spearheads of the "laurel-leaf" and "willow-leaf" patterns are certainly the most beautiful weapons ever formed out of so stubborn a material (see p. 163).

As M. Breuil has shown, the distribution of the remains of the men of Solutré seem to point to an immigration from the East. Characteristic finds are those of Oicow (Russian Poland), Hungary, Moravia, Bavaria. One might even suspect that they invaded France by the historic gateway at Belfort, and thence spread round the central plateau. They did not actually enter the Pyrenees, but seem to have passed to the west of them as far south as Santander in Spain. If these Solutréans are represented by the brachycephalous skulls of Furfooz, Grenelle, and La Truchère, then they were but the forerunners of Neolithic invaders, and even of those of much later date, such as the Sarmatians (200 B.C.), Slavs (A.D. 500-600), Tartars (A.D. 1300), and of all sorts and varieties of ferocious nomad horsemen—Huns, Avars, Magyars, Turks, and the like—whose mission it seems to have been to utterly destroy the tainted and corrupt civilizations of Europe and Asia. The Solutréans seem to have left Europe even before the Magdalenians, as would be but natural if they were a Steppe people following the migrations of the reindeer. In that case they would travel eastward, and would become mixed up with other brachycephalous people of Central Asia.

M. Breuil suggests in a recent paper that there was perhaps in West and Central Siberia an independent development of industry, owing something perhaps to the Aurignacian, but distinct and without the decorative art of the Madeleinian in Western Europe. M. Breuil thinks that, from this centre, successive swarms pushed

their way along both shores of the Baltic and Northern seas as soon, and in so far, as these became possible dwelling-places for man.

In this way he explains the similarity of certain rather elegant harpoons found both on the Baltic and in Eastern Russia. Rock engravings of animal figures found in Scandinavia are also identical in style with others in Siberia, on the Urals, and in the North Altai. If so, there would be a northern division of the Furfooz race, probably crossed with Magdalenian or Cromagnon stock.

The dog seems to have been the very first friend of mankind, and the story of its domestication must be taken first. Both wolves and jackals occur in the middle of the Pliocene period. *Canis etruscus* was a sort of wolf, and *C. nescherensis* may be the ancestor of the jackals. In the Ice Ages a jackal-like animal, *C. mikii*, seems to have been in existence. Now, in India to-day, both jackals and the more or less domesticated pariah, or "pie-dog," haunt the villages, and find their unpleasing food in middens and "free cowps." We assume that the first domestication of the dog took place not in India, but somewhere in Persia, or possibly Turkestan. It is extremely probable that *C. mikii*, or something allied to it, would haunt the camps and kitchen middens of prehistoric man just as the modern jackal hangs about the outskirts of a village in India.

So he may have changed insensibly from the status of a wild jackal to that of a pariah dog. In Egypt, during the First Dynasty, the jackal is said to have been kept in captivity. Sooner or later prehistoric man or his children began to take interest in *C. mikii*.

Even now in the East dogs are not looked upon as companions, but more as necessary evils. The dogs keep watch at night, and are also inexpensive scavengers' carts, which walk about without requiring attention and carefully search the villages. When the earliest Neolithics came westward into Europe, they would bring with them these

jackal-like dogs, whose duties and privileges may have, in course of time, expanded. Besides acting as watch-dog and as a sanitary department, the Neolithic animal may have also assisted in hunting, and was himself eaten in periods of scarcity.

In the lake dwellings of the Neolithic period the usual dog (*C. familiaris palustris*) seems to be a slightly modified form of the same animal. Under the conditions which would prevail in Early Neolithic or Late Palæolithic times, no sort of care would be taken in breeding the dogs of the community, and they would, in all probability, occasionally cross with the wolves or wild dogs of the district. Authorities differ as to which of these wild species is responsible for the modern dog. Prince Poutiatini discovered near Lake Bologoia in Russia a deposit of early Post-Glacial Age which included remains of the Saiga antelope (a characteristic Steppe animal), and also of a very dog-like wolf, which has been called after him *C. poutiatini*. The interesting point about it is the great elevation and width of the skull as compared with modern or extinct wolves. It is closely allied to the Dingo of Australia, and to the half-wild dog of Java (*C. tengerranus*). This may have been one of the past ancestors of the Neolithic dogs. MM. Boule and Trouessart, however, suppose that an Indian wild dog, *C. pallipes*, was the chief ancestor.[2] An Abyssinian species (*C. simensis*) has been also suggested. The dogs of Majorca are very like it, and also those of Egypt.[3] There is some direct evidence that an original jackal-like type slinked about near the dust-heaps of prehistoric man, or followed him when hunting. The drawings found at Alpéra in Spain show, according to M. Breuil, that this was the case. Indeed, one drawing represents, according to him, a hunter encouraging his dog to follow the trail.[4] The drawing is, perhaps, not quite convincing.

It seems, however, very likely that some local wolf followed the hunter about in a stealthy, unobtrusive

fashion, just as the coyote used to shadow the Red Indian. But it seems to us more probable that a jackal type was the first to be domesticated, and that this ancestor is responsible for the love of the ash-heap which exists in all domestic dogs. Somehow or other, prehistoric man began to take notice of this humble creature, and, instead of destroying it, allowed his children to play with the puppies; perhaps he found pleasure in the good-natured friendly patronage with which most people treat nice dogs. When this animal crossed accidentally with the local wolf, the offspring might be of use in hunting, and in process of time could be trained to be of real service. If this sketch is correct, the great acquisition to humanity of the first domestic animal is due not so much to intelligence as to a feeling of kindly tolerance or good nature.

We rather prefer *C. poutiatini* as the first wolf-ancestor of such forms as the Siberian, Eskimo, and Newfoundland, and perhaps of all dogs, for if the first cross took place in Persia or Turkestan, the ranges of the jackal and wolf type would coalesce in part of this district. In Egypt and North Africa, as well as in the Balearic Isles, one would expect traces of *C. simensis*, and in Northern and Central Europe of the European wolf. A curious point with regard to the further history of *C. poutiatini* under domestication is that his brain seems to have undergone very much the same experience as that of man himself. It was from the beginning larger than that of other wolves. The following figures show that it increased with domestication:

	Canis poutiatini (origina).	Early Neolithic.	Bronze Age.	
			C. intermedinis.	*C. matris optimæ.*
Elevation of skull ...	29·5	33·7	33·5	32·9
Width of skull ...	33·7	34·3	35·3	—

It is quite probable that the men of Furfooz, or later Asiatic invaders, brought, by way of the Danube, some of these hunting-dogs into Europe. That would be one source of our present canine breeds.

The Neolithics came to Europe from the Levant, and they also brought with them their best dogs. When they settled in the lake dwellings, these dogs crossed with the European wolves, and diverged slowly into the modern breeds, of which the following are the most important:

Collies and Sheepdogs may be from the Bronze Age dog (*C. matris optimæ*), partly European wolf, and partly jackal × Poutiatini.

Scotch Deerhound from *C. Leineri* of the Swiss and Irish lake dwellings, and chiefly wolf.

Hunting dogs with hanging ears from *C. intermedius* (Austrian Bronze Age), wolf × Mikii × Poutiatini. These include foxhounds, spaniels, pointers, setters, and basset-hounds.

Terriers and Pomeranians from the common *C. palustris*, of Swiss and Ladoga lake dwellings, of the Rhineland (Roman period), and Italian terramare. These may have little or no European wolf in their composition, but be mainly of jackal-like Mikii with a distant strain of the small Eastern wolf (Indian or Egyptian).[5]

With any kind of dog, however embryonic its ideas of hunting and watching, the taming of other animals is much easier. The very first stage of domestication is, perhaps, most clearly seen to-day in the half-wild herds of the *Reindeer Tschuktchi*, who live in a cold and inhospitable district of North-Eastern Asia. Their life has been described very fully by Bogorras.[6] These animals are at the most half-tamed. They have to be constantly watched, for, when restless and bothered by insects in summer, a whole herd may suddenly run away and plunge the owner into a state of absolute beggary. A rich man may own 1,000 animals, and a herd of 300 to 400 is sufficient

for a comfortable livelihood. The Tschuktchi has some faint idea of breeding, and catches wild reindeer to keep his stock vigorous; but the animals are only used for food and clothing.

It is chiefly those that die in summer that are eaten; the blood, eyes, etc., are devoured raw, and even half-chewed moss from the stomach of a deceased reindeer is not despised. They collect roots of Pedicularis, Oxyria, etc., in summer, and use these to flavour their broth along with blood and fat.

They dress in reindeer calfskins worn double (with hair inside and out), which makes warm, soft, and flexible clothing. They even had coats of mail and shields made of strips of hide, and use bows and arrows as well as spears. The reindeer are protected, for the Tschuktchi trap wolves and foxes, and presumably drive the herds to favourable feeding-places. Such an existence seems to us to be a very miserable one, and their domestication of the reindeer hardly worth being called so. Yet it is really a tremendous advance beyond the mere hunting stage. Stefansson has lately stated that the Cape Smythe tribe of Alaskan Eskimo has been practically exterminated owing to their own folly in destroying the wild reindeer on which they lived.[7]

In the extreme north-east corner of Europe there are still Lapps who have herds of reindeer, which not only supply them with flesh and clothing, but with milk, cheese, and a useful draught animal. This stage is as much superior to the Tschuktchi as is that of the latter to the Eskimo, who has only the dog.

A retired pirate named Ottar, who lived in Norway at a very early period, possessed a herd of 600 reindeer, as well as 20 cows, 20 sheep, 20 pigs, and a few horses.[8] This represents a still higher level of civilization.

The ancestors of Ottar's cows seem to have been first domesticated some eleven thousand years before his time, and, so far as we know, at Anau in Turkestan. The

remains of this ancient settlement are supposed to go back to about 10,000 B.C. In this earliest portion of the Neolithic Age, remains of the Wild Urus (*Bos primigenius*) are common enough; but at a supposed date of 8,000 B.C. this animal seems to have been tamed, and had become a tall and stately longhorned ox, a strong-boned and heavy beast, which was undoubtedly the ancestor of many important breeds of cattle in both ancient and modern times.

The wild type (*B. primigenius*) seems to have varied but little, whether in Europe or in Asia,[9] and is but slightly different even from its Pliocene ancestor (*B. planifrons*).

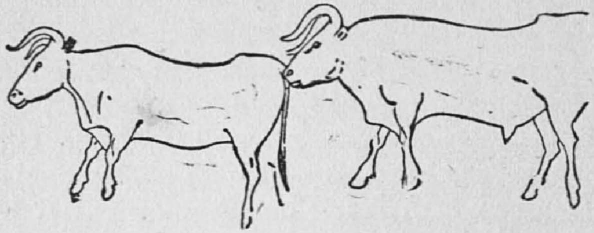


FIG. 17.—THE WILD OX OF FRANCE IN PALÆOLITHIC TIMES (*Bos primigenius*), DRAWN BY A CONTEMPORARY MAGDALENIAN ARTIST.

Note horns directed forwards and large brisket. From La Mairie, Teyjat, Dordogne.

(M. l'Abbé H. Breuil, Compte Rendu Congrès Préhist. Fourteenth Session.)

So far as it is possible to judge from illustrations, this great ox of 8,000 B.C. had reached Chaldea and Babylon (Summero-Accadian) at from 4,000 to 3,000 B.C., and even travelled to China as far back as 3,468 B.C. In Africa, we think it can be traced in the Ankoli ox, and the large brown cattle seen by the author near the headwaters of the Kagera. The Roman ox is surely partly descended from it, as well as the Andalusian and such breeds as the Hereford, Longhorns, etc., in England.

But another animal occurs at the same place (Anau) at a rather later time—viz., about 6,000 B.C., which, under the name of the "Celtic Shorthorn," has played a great

part in the development of our modern breeds. This (*B. brachyceros*, or *B. longifrons*) is described by Duerst as a *Kummerform*, or small dwarfed or stunted variety of the great ox already mentioned. It is this point which seems uncertain. Was this later smaller beast with small, or even no horns, only a variety of the original Urus, or did it contain a strain of some different species? In Pliocene times in India, there was, besides the ancestor of the Urus, another species (*B. acutifrons*) which, according to Professor Ewart, may have had some influence on the Indian breeds of cattle. In some of the oxen discovered at the Roman fort of Newstead near Melrose, traces of this Indian type have been detected.

Now, there is a marked difference between the Zebu of India and the Urus. One can hardly think that the one is just a dwarfed descendant of the other. Even in our common breeds of cattle to-day, Zebu-like traits can be detected—as, *e.g.*, in the Jersey cow. So that it seems most reasonable to suppose that the "Celtic Shorthorn" (which was not in the least like our Shorthorns, and had never seen a Celt when it arrived in Europe) had, when it was first tamed in the East, strains of another species besides the Urus. From this other species the Zebu is also descended.

In the later Stone Ages and in medieval times, cattle in Central Europe were probably allowed to run more or less wild in the forests. Under such conditions they would occasionally be crossed with the wild Urus, which existed in Germany until comparatively late times. So that crosses were formed larger and heavier than the original Celtic Shorthorn, and these seem to be responsible for the big, strong-boned cattle of many parts of Germany and Holland. The wild cattle of Chillingham and Cadzow seem to be crosses of this kind.

The nearest of our British breeds to the "Celtic Shorthorn" is, perhaps, the Kerry cow. With, however, the exquisitely drawn picture of the Wild Urus by a

Madeleinian artist of some 12,000 B.C., the reader, if interested in cattle, will be able to see how its characteristic traits continually appear in all our common breeds.[10]

The history of sheep is even more difficult to trace than that of cattle. It is quite likely that they were brought into Europe by two distinct and different routes. The Swiss lake-dwellers of early Neolithic times possessed the "peat-sheep," which may have come from Asia via the Danube. This may explain why some authorities state that the Asiatic Urial (*Ovis vignei*) or the Steppe sheep (*O. arkal*) are part ancestors of our modern breeds.

On the other hand, the Mediterranean race may have brought a different breed with them, and certainly some European sheep do resemble the wild moufflon of Corsica and Sardinia (*O. musimon*) or the Armenian species (*O. orientalis typica*).[11] The differences between the various authorities disappear if we suppose that all our modern breeds are crosses of these various species, in different proportions. The curious little brown, often four or five horned sheep of St. Kilda and Skye, seem to be related to the moufflon.

On the other hand, the goat is said to be descended from the wild species (*Capra ægagrus*) of Asia Minor and the Grecian islands. The earliest pastoral folk kept their animals in huge herds and flocks moving on into new country as soon as ever the pasture was eaten down.

The annual migration of cows up into the highest Alpine pastures every summer, both in Norway and Switzerland, is the remains of the same nomadism which is followed to-day both in Swaziland and in Asia Minor. In La Crau, France, some 400,000 sheep are driven up to the hills every summer. The journey is long, but is divided into easy stages of 10 kilometres. In Spain there were, in the fifteenth century, immense flocks of sheep. One company is said to have owned 7,000,000. Free sheep-walks, 90 feet in width, were kept up along every highway.

These are survivals of the life of the wandering herds-

man of the Steppe, and of his method of keeping cattle. They are, however, by no means extinct, even in the Asiatic Steppes, where they still live in skin tents, and have a plentiful supply of butter, milk, cheese, and usually some alcoholic drink, as well as of mutton. But the point which is of most importance to us here is the effect of this sort of life in producing not only breeds of cattle, sheep, and goats capable of looking after themselves without much assistance, but also a kind of man of a totally new character. There must have been, as soon as this sort of life became possible, an extraordinary increase in population. Both men and animals would multiply with extreme rapidity in a practically unlimited ranch such as were the Steppes in this early period. The life was healthy enough, though dirty and restless.

The mere fact of living in company involves an invaluable discipline, and would also develop the cool-headed, far-seeing caravan leader, able to control and direct migrations. As we shall see later, nomadism led to war, and also to the conquest of Europe in the west and of China and Japan in the east, by hordes of wandering herdsmen.

The camel, the ass, and the horse were of course invaluable animals in the development of the great caravans of Asia.

The ass is supposed to be descended from the wild ass of Nubia and Somaliland. Ridgeway, Ewart, Boule, and others have, however, traced out the history of the horse with extraordinary care, and we must try to explain this rather difficult question. There seem to be at least three different and distinct species of horse in the ancestry of our modern breeds.

Two of these existed in Europe during the Glacial period, for their characteristics are quite clearly to be traced in the life-like drawings and paintings of the Madeleinian artists. One, Prjevalsky's horse, is still wild in the most out-of-the-way Asiatic Steppes (Gobi and Altai). It has a short upright mane, a long mule-like tail

with a few long hairs at the base, and a middle fringe of long hairs. Its hoofs are long, narrow, and contracted at the heel. It is in no respect an engaging animal, for its head is very long, badly put on, with extremely large nostrils. There is a sheep-like look about the nose which is bent downwards. The last characteristic enables it to feed conveniently on the short grasses of the Steppes. It has an extremely vicious disposition and an indomitable temper. MM. Piette and Martin were convinced that this creature had been domesticated by the Madeleinians, and there are signs on many drawings of this age which can be interpreted as halters or even bridles (see p. 169).[12]

However, traces of Prjevalsky's horse have been found in several breeds, notably in the Connemara pony, Clydesdale, Welsh, and Shetland ponies, even in Irish hunters, as well as in Spain and in Austria. The horses represented on Hadrian's Villa (about 600-500 B.C.) resemble it closely except as regards the tail. It seems, then, that this species must have been at one time used, at any rate, for crossing with other species. The forest horse (*Equus robustus*) of the Ice Ages lived at Solutré in Madeleinian times. This is probably the horse of the Brighton "Elephant bed." Its mane and forelock are long and flowing, of dark, wavy, coarse hair; it has no tail-lock; very rounded hindquarters, and the tail is low set on. The hoofs are broad and wide behind, and the fetlocks are hairy. It has a very broad forehead, with a long prehensile upper lip and thick projecting lower lip, and it had a straight head, not a Roman nose; the neck is short and thick. In every respect this animal is adapted to living in woods, among thorny thickets and narrow paths in wet and marshy ground. It seems to have been an intelligent, good-natured sort of beast. According to Professor Ewart, amongst its descendants are the Highland pony, Ardenne, and Flemish (black funeral horse), Clydesdale, Shire, Suffolk, and Connemara pony. Its original colour seems

to have been a dark yellow dun with dark stripes on face, body and neck, and with bars on the legs.

But the real difficulty is to know where horses were first tamed. They certainly existed in the south of France in Madeleinian times, but are supposed to have migrated with the reindeer to the north and east. At any rate, the horse is not known in Europe as a wild animal after at most 16,000 B.C.

If it should be discovered farther East, in the Caucasus, in Late Palæolithic or in Early Neolithic times, this would solve the difficulty (see p. 209). The third variety of horse seems to be descended from *Equus siwalensis* of the Indian Pliocene. It stood about fifteen hands high, and was not unlike an inferior Arab, or perhaps a "weed" from a racing stable. It had a long and flowing mane, with forelock, and also a curious bunch of hairs at the root of the tail, which is high set on. The head is small, usually straight, with narrow nostrils, and looks spirited and intelligent. The bones are slender and fine; in disposition this, the parent of the Arab steed, is, or ought to be, all that can be desired. The colour seems usually to be bay, with often a white star and white stockings. Although this species was living in the Pliocene period, not only in India but in Auvergne, on the Arno, and even near Torquay, it seems to have vanished from Europe during the Ice Ages. The Siwalik (Indian) form is still represented in India and other parts of Asia. It seems probable that there was a wild African variety of this species. There was a great traffic in horses from Egypt, which seems to show that horses existed in Libya or somewhere in North Africa, whilst they were still unknown in Asia Minor. Certainly Africa seems to have been a horse-breeding place in the early historical and Prehistoric period. In Pindar's time, the best horses were from Africa. The Neolithic people at Walthamstow in Essex had horses of this type, which presumably came from Spain, along with the Neolithics themselves. In Rome

about A.D. 100, when chariot-racing was almost as much a national game as horse-racing in modern England, a celebrated driver, "Avilius Teres," gives the names of his winners. Of these twenty are of African origin, one from Morocco, and one from Spain. There are only three others (two Greek and one from Gaul). The so-called "Celtic pony" also occurs in Britain about 54 B.C., and about A.D. 200 amongst the Roman legionaries at Newstead Fort, Melrose.

If we suppose the Celtic pony to be descended from the African or Libyan variety of *E. siwalensis*, the above distribution is quite clear and reasonable. But the story of the Eastern or Asiatic horse is very difficult to follow. According to Meyer, horses were unknown in Babylonia before 1900 B.C. They are said to have been brought by the Iranians (Brachycephalic Steppe nomads?) from the highlands of Persia about 1800 B.C.[13]

This part of Persia (Iran) would be close to a district over which both Steppe horses and the supposed Indian *E. siwalensis* (a sort of thoroughbred type) may have ranged together. Now, if these Iranians long before that time had kept herds of the Steppe (or Prjevalsky's) horse much in the same way as the Tschuktchi kept their reindeer, they may have improved the breed (as the Tschuktchi did) by crossing with the better-natured animal. So the horses brought to Babylonia by the Iranians would be a cross of *Steppe* × *siwalensis*. These would perhaps be ancestors of Achilles' dun and apple-dun steeds, and of Avilius' Peloponnesus horse. The Gaulish horses probably came from Asia also, but no doubt by the Russian Steppes, and may have been a cross of the same character. What is said of the horses of the Gauls bears out the view that they were a cross of the Steppe horse with the Siwalik type.

But the reader will observe that these details entirely fail to explain the origin of our cart-horses and of the heavy breeds generally. This point is most obscure. The

forest horse, which is supposed to have been responsible for them, has been recognized in Magdalenian drawings, as, *e.g.*, in the Combarelles cave, and is probably descended from a distinct Pliocene species. It seems to be unknown both in Africa and Asia. It is perhaps worth pointing out that the breeds which show its influence best—notably the Flemish mare, the Ardennes (funeral horses), the Paris omnibus horse, the Percheron, as well as some Norwegian types, and our Clydesdale and Shire—seem to radiate from the Teutonic centre or the original home of the northern or European race of man.

Is it possible that in the forests of Northern Europe the Palæolithic horse survived with the Bison and Urus until horse-riding began to be understood? [14]

Swine were of the greatest importance in Europe in days when a vast proportion of the Continent consisted of dense oak scrub or forest upon which, as yet, a very small impression had been made. So in the Gaul of Cæsar's times, pork with milk was the main diet of the Celts, who carried on a great trade in salt pork with Rome in the days of Strabo. Their hams were the best known in the Roman world. In England also during Saxon and early mediæval times, even during the Peninsular War in Spain, great herds of swine which fed on acorns or beech-mast were of the first agricultural importance.

The history of the common pig resembles in a very curious way that of other animals. A very large proportion of our modern breeds springs from the almost universally distributed wild boar which may have been first domesticated anywhere. But even in the lake dwellings of Switzerland and Brunswick there were two varieties of pigs both domesticated (or more or less so). One of these differs only in the reduction of its teeth from the wild boar, and is clearly descended from it.

The other type is said to have strong affinity with certain Indian breeds, but according to others is identical with the species living to-day in Sennaar, North Africa.

This surely means that a common ancestor in Mesopotamia divided into two groups. One of them (Asiatic) is responsible for the Indian (*Sus vittatus* and *S. celebensis*), and the other for the African (*S. sennariensis*).[15] In all probability this ancestral form came up the Danube with the invading brachycephalous people, and became subsequently modified by crosses with the wild boar in every century. The harmless necessary cat (a native of Africa, *Felis ocreata*) was, as is well known, domesticated in

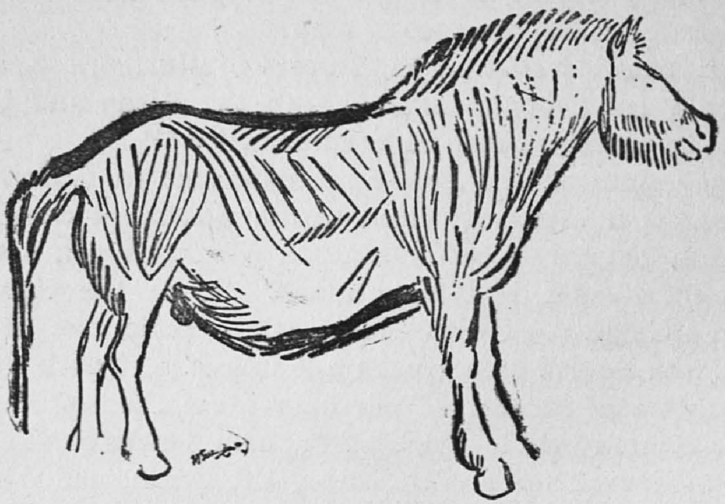


Fig. 18.—Typical Steppe Horse.

From cavern of Niaux, drawn by prehistoric artists.
(M. l'Abbé H. Breuil, *L'Anthropologie*.)

Egypt at a very early date. It did not appear in Britain until a late period (A.D. 800 to 1000). It is very remarkable that there seems to be but two districts in the world where animals have ever been domesticated. Almost all of them belong, as we have tried to show, to the Mesopotamian region, in the broad sense in which we have taken it. One other important centre existed in Central and South America, where the llama and alpaca were trained by the half-civilized and most mysterious people, whose history has not yet been unravelled.

Who were these ancient Anau-li who are responsible for this enormous gain to humanity? They may have belonged to the original Hamitic or Mediterranean race. But the reindeer Tschuktchi are brachycephalic; the lake-dwellers who appeared in Early Neolithic times were also brachycephalic. To the same group belong the typical nomads of the Asiatic Steppes.

The point where these two great divisions of mankind meet is the spot where, so far as our indications go, dog, cattle, sheep, goat, horse, camel, and pig first entered the service of man. As we have to ascribe to the long-headed Mediterranean the first beginnings of agriculture, it is perhaps allowable to give most of the credit of domestication to the brachycephalic type of mankind. Their original home is said to be near Turfan in Turkestan.

Skulls from this district show a very marked brachycephaly (index, 91·6). They had a moderate brain (1,410 c.c.), a convex and high forehead, a broad face, and prominent nose. There was no forward projection of the upper jaw, nor was there any marked eyebrow ridge.[16] From Turfan the way to the east is open, leading to the country of the Jakuts, Tungus, Tschuktchi, Mandchus, as well as to Corea and Japan. Westward also, through the the Tianschau mountain passes, there are roads to the country of the Finns and Ugrians. Perhaps the Sumero—Accadians travelled south-west from the same centre.

Most of those who came west in the earliest times (*Homo alpinus*, or Wilser's "brachybrune") are dark-eyed, with rather straight, lank, and black hair, and of middle height, or sometimes squat. But they are not generally so extremely broad-headed as the Ugrians mentioned above.

Thus the Kirghiz of the middle horde, though dark and broad-faced, only average 83. The Poles of New Alexandria, belonging to the Slav peoples who brought Slavonic culture from the Danube into the Carpathians, have often dark brown hair and grey eyes. They have an

average cephalic index of 82·67.[17] In the nature of things, even if the original broad-headed man was black-haired and excessively broad-headed, he could hardly have reached either the Carpathians or even the Kirghiz country without becoming mixed up with other peoples. We shall have to trace afterwards the manner in which these swarms of broad-headed, medium-sized horsemen, proceeding westwards with their waggons and huge herds of cattle, at first by a sort of "peaceful penetration," dispossessed, and then, as barbarian invaders, nearly exterminated the original Europeans.

But if the view suggested above is correct—namely, that it is they who first tamed reindeer, cattle, sheep, goat, and horse—their services to humanity far outweigh any destruction caused by them during a thousand years or so. It may be that children (not grown-up people) brought about the training of the dog. If not children, a kindly, good-natured sort of person may have first made friends with the puppies of a jackal or a Poutiatini wolf, instead of (as would have been much more sensible) making his dinner off them. Here, again, some trivial common incident led to the most surprising results.

[1] Myres, *Geog. Jour.*, December, 1906.
[2] *L'Anthropologie*, 1911, p. 678.
[3] Keller, *L'Anthropologie*, 1912.
[4] Breuil, Gomez, and Aquila, *L'Anthropologie*, 1912.
[5] Duerst, *L'Anthropologie*, 1908; Studer, *L'Anthropologie*, 1905.
[6] Stieda, *Arch. f. Anthrop.*, 1907.
[7] *Geog. Jour.*, May, 1913.
[8] Demolins, *Grandes Routes des Peuples.*
[9] The Asiatic form is *Bos namadicus.*
[10] *Cf.* Hughes, *Archæologia*, 1895, vol. 55; Ewart, Proc. Zool. Soc., 1911; Zengel, *Arch. f. Anthrop.*, 1910; Lyddeker, *Guide to the Domesticated Animals*, 1912. Also De Morgan's original paper.
[11] Lyddeker, *loc. cit.*; Trouessart, *L'Anthropologie*, 1912; Keller, *L'Anthropologie*, 1912.
[12] *L'Anthropologie*, 1911.
[13] *Ibid.*, 1908.
[14] Ewart, Proc. Roy. Soc. Edin., vols. 24, 26, 30; Trans. Roy. Soc. Edin., 1907, vol. xlv., part iii.; Proc. Roy. Soc. Lond., B 1909, vol. lxxxi.; Trans. Highl. and Agric. Soc., 1911. Marshall' Proc. Roy. Soc. Edin., vol. xxvi. Ridgeway, *Origins of the Thorough*

bred Horse. The clearest distinctions between the three types are in the following measurements :

	Steppe Horse.	Forest Horse.	Libyan Horse.
Chestnuts	Occur	Occur	None
Cannon bone (metacarpal)	Length 6·6 × width	Length 5·8 × width	Length 7·5 × width

[15] See Laloy and Fiedler, *L'Anthropologie*, 1908.
[16] *Cf.* Lissauer, *L'Anthropologie*, 1905.
[17] Iwanowsky, see *Arch. f. Anthrop.*, 1905 ; Derchinsky, *Arch. f. Anthrop.*, 1905.

CHAPTER XIII

THE FIRST HARVEST

In the last chapter we tried to show that a sudden increase in population must have followed at once on the domestication of cattle. Hunting savages can hardly increase in numbers at all; an old calculation of Lord Avebury gives 6,471 acres as the area required for a single Red Indian living only on wild animals. But domestic animals, under favourable conditions, may double their numbers every year.

So, one of the first effects of the domestication of animals was an enormous increase in the number of human beings; the area occupied by wild animals and hunting savages then began to shrink and diminish. But so soon as the first seed was planted, or the first kernel placed in the ground, the possibilities of human development changed altogether.

In the first place, crops yield twenty to thirty fold; in good and fertile soil a large family can be reared—that is, on a humble Eastern scale of living—on a very small area. This in itself meant an enormous improvement in the outlook for humanity, but perhaps even more important was the possibility of settled villages, where men could reside permanently in close contact with their fellow-men. A new type of man could now form itself: disciplined, taught to work, capable of appreciating human companionship, benefiting by the exchange of ideas, and profiting by every new invention[1] (see p. 226).

Instead of being dependent, like the pygmy, on small game and wild-fruits, or on wild animals whose numbers

man could only lessen, not increase, with the keeping of herds and the sowing of crops, man became in a humble way the master of Nature, though, of course, he was never free from the duty of labour and the possibility of failure. As in the history of every other improvement of the first importance to mankind, every detail of the very first harvest remains mysterious and obscure. Tradition is usually silent on the subject: if there are legends they generally say that it was the God they worshipped, or as, *e.g.*, in Peru, the glorious son of the Sun who gave to poor humanity this inestimable boon. It is curious to find many instances of peoples who lived in large part on seeds and fruits, but who never discovered the great invention. The Luiseno Indians divided the land up amongst the various families, and lived on seeds of Wild Oats, Clover, Sage, and Chenopodium, as well as on Acorns, berries, and bulbs, but planted nothing.[2] So also the Kwakiutl Indians in North America collected berries and roots, drying them for use in winter, and eating them with fish oil.[3]

Even the Australian women regularly collected wild rice, millet, and leguminous seeds, which they ground into a sort of meal.[4] In Selangor (Malaya) the natives used at certain seasons to go to those parts of the jungle where there were many fruit-trees. They ate them in small shelters erected for the purpose. Having noticed that there were more young trees near these huts, they made fresh shelters in various places, and even went so far as to clear away the jungle round the young trees, but they never went so far as to plant a single fruit.[5]

But a really original idea is most unusual, and the bold courage that will make even a simple experiment is rarer still. Man is always radically conservative. A race accustomed to hunting and living on some particular food is only induced to change its diet with the greatest possible difficulty. When Stefansson and the Western Eskimo tried to induce their friends, the Eastern Eskimo, to eat

the delicious salmon-berry (*Rubus spectabilis*), they met with no success, except that a few children learnt to appreciate it.[6] Indeed, one can find but one inducement which may have forced the first, perhaps the greatest of all gardeners, to plant and sow. Some tribe, with a Bushman's knowledge of botany, and forced by famine, very likely due to drought, sowed the first harvest. Those people who lived in the great cavern of Mas d'Azil, have been given the credit of knowing corn and perhaps of sowing it.[7] But the usual view at present is that some rat, more provident than the Azilian, had stored the corn in this cavern for its own purposes.

We do not feel certain that this last explanation is correct. Simple, striking disproofs of this kind generally turn out in the end to be altogether wrong; but even if the Azilians did grow corn, it is unlikely that either they or those Newer Stone peoples, who entered Europe at a very early date, invented agriculture. The Neolithic people all came from the East; some by the Mediterranean, others by the Danube; and it is to the East that one is forced to look for the origin of this greatest of all discoveries. Mannichtousan, King of Kis, who lived near Susa, about 150 miles north of the Euphrates' mouth, set up an obelisk, between 4,000 B.C. and 3,500 B.C., upon which is recorded a sale of land. The price was fixed by the value of the crop. The King bound himself to nourish, clothe, and protect the serfs and slaves which were attached to this estate, and had to cultivate it.[8] One may point out in passing that even in European Russia, within our own times, the serfs went with the estate, showing hardly any improvement in a period of nearly 6,000 years. But the King of Kis clearly ruled a community, which had advanced a very long way in the cultivation of the soil and in general civilization. There are some 50 feet of refuse at the place in which this obelisk was discovered. Even the very lowest of these seems to represent industries more advanced than those of the

Azilian. We have seen that about 8,000 B.C. cattle were domesticated in Elam. Except that planting of some kind was probably in practice before this last period, we have no further clue as to the actual date.

Yet if Evans is right in considering 14,000 B.C. as the first Neolithic settlement in Crete, corn must have been planted long even before this early period. The best guess as to the date of the first harvest is perhaps between 15,000 B.C. and 10,000 B.C. It is possible to get a little nearer to the place by a careful examination of our cultivated plants. Should most of them be found wild in one particular district, there is, at any rate, some probability that this contains the first harvest-field. A very short examination shows that there must have been two centres. There is a group belonging entirely to the Old World, as well as an American one, of which we shall defer consideration.

But we want a working hypothesis. It is clear, then, that some district is required, where all or most of the great floras of the Old World are in contact. Our European north temperate plants form one enormous division, which extends, roughly speaking, from Ireland to Japan. In Asia it reaches to the south of the Caspian, and in the Caucasus there are alpine, temperate, and warm temperate plants. Another great group of plants is Boissier's *Flora Orientalis*, which flourished in North Africa, in Palestine, Syria and the Levant. The tropical African flora and that of Indo-Malaya are separated to-day from these two by broad stretches of arid desert or high mountains. A wet tropical jungle might have existed in the Persian Gulf during the existence of man, but if so, there is no proof of it. On the whole, however, the meeting-place of continents, our first Home of Man, is the nearest we can get in the Old World to a meeting-place of floras. Let us test this hypothesis with fifty of the commonest plants in cultivation, including especially those known to have been used in very ancient times.

We keep to our definition of north and east of Suez, west of British India, south of the Black Sea and the Caspian.

	Original Species found in this Area.	Unknown in Wild State.	Original Species is a Native of—	Details of Use in Prehistory.
Wheat:				
Var. *sativum*	—	*		Used for 5,000 years
Var. *monococcum*	*			Lake dwellings (Troy)
Var. *dicoccum*	—	*		Lake dwellings (Swiss)
Var. *compactum*	—	*		Lake dwellings
Rye	*			Bronze Age (Olmutz)
Oats	*			China, 2,800 B.C.
Rice	—		Cambodia, Borneo, Abyssinia, Niger	
Barley				Lake dwellings
Millet:				
Panicum miliaceum ...	* (?)		Perhaps East Indies	Very ancient Germany and Africa
P. colonum ...	*			Used Egypt, 4,500 to 3,000 B.C.
Eleusine indica ...	*			Used Egypt, 4,500 to 3,000 B.C.
Pennisetum typhoideum	* (?)		Nubia, Egypt (?)	
Setaria italica ...	*			Lake dwellings
Beans, broad ...	*			Swiss Bronze Age (Troy)
Peas	—		Eastern (?)	Lake dwellings of Bronze Age (Swiss)
Cyperus esculentus	*			Egypt, 4,500 to 3,000 B.C.
Onion	*			Chaldea, 5,000 B.C. Large sums paid for these when pyramids were built (*vide* Herodotus)
Leek	*			
Garlic	*			
Carrot	*			
Parsnip	*			
Turnip	?	Western Europe (?)		
Beet	*			
Lettuce	*			

	Original Species found in this Area.	Unknown in Wild State.	Original Species is a Native of—	Details of Use in Prehistory.
Chicory	* (?)		Egypt (?)	
Endives	* (?)		Egypt (?)	
Asparagus ...	* (?)		South Russia and Steppes	
Globe artichoke	* (?)		Southern Europe	
Cress	*		Babylon	
Mustard	*			
Gooseberry ...	*			
Black and red currant ...	*			
Raspberry ...	*			
Vine	*			Southern Caucasus
Cherry	*			
Plum	*			
Apricot	*			
Peach	*			
Quince	*			
Apple	*			
Pear	*			
Almond	*			
Chestnut (Castanea)	*			
Walnut	*			
Fig	*			
Date-palm ...	*			
Cucumber ...	*			Cultivated 3,000 years (India)
Cocoanut ...	—		India or Pacific?	
Breadfruit ...	—		India (?)	
Banana	—		India or Africa?	

The following have been specially consulted: Hackel, *True Grasses*, etc.; Stapf. Proc. Linn. Soc., December, 1912; Neolitzky Beih, B.C., Bd. 29, ab. 2; Henslow, *Jour. Royal Hort. Soc.*, May, October, December, 1911.

Of the fifty plants in this list, *four* are at present only known in a wild state, or are believed to be truly wild outside this area. There are also four plants which are quite unknown except as cultivated species, and there is some doubt as to seven others. But as 70 per cent. are believed to be natives of this area, the confirmation of our working hypothesis is as strong as one has any right to

expect. The four exceptions are all purely tropical. Of both rice and the banana, there are Asiatic and African wild species. Arctocarpus was very prominent before the Pliocene period, even in Europe.

The reader may perhaps be a little surprised at noticing such entries as Eleusine, *Panicum colonum*, the Edible Sedge, etc., but Neolitzky, who found remains of the two last mentioned in the intestinal parts of certain Egyptian mummies, has pointed out that an enormous number of plants were in ancient times sowed regularly. Our garden and field plants to-day are the choicest survivals only. Millet, for instance, was once of great importance in Germany. The Roumanians are not so careful in their choice of vegetables, for all the following are still regularly used: Levisticum, Amaranth, Dandelion, Sow-thistle, Nettle, *Ranunculus plicaria*, *Allium ursinum*, Colts-foot, Earthnut, two species of Dock, Atriplex, Lime, Sorrel, Buttercup, and others.[9] In ancient times, every-where, people were by no means so particular as they are to-day.

In the Mesopotamian region, the floods of the Tigris and Euphrates, spreading rich fertilizing soil on the broad alluvial plain, may have suggested to the earliest cultivators two invaluable improvements—viz., irrigation, and the use of manure. Both seem to have been practised in Egypt and in Mesopotamia as far back as we have any possibility of tracing agricultural methods. Both manures and irrigation are found in almost every place once inhabited by the Mediterranean race. Their methods of working the soil were careful and laborious, an intensive culture of the most painstaking description. Day after day the soil is visited; no clod a cubic inch in size is permitted to remain unbroken; every weed is picked out by hand and fed to the goats. Ploughs made of a curved branch of a tree were common and they are, in fact, still used in Norway and Portugal. These are dragged by any animal which the proprietor may happen to possess. Donkey,

pony, the cow and its calf, even the camel, and not infrequently the proprietor's wife and daughters are harnessed to it. Even the animals are often fed and grazed in the same sort of careful and miserly way.

Sheep are tied to a rope, and led out to graze along some tiny path, where a few square feet of rough grass still exists. In Guernsey to-day the cows are led about in chains, and tethered each to eat thoroughly its own sector of grass.

The daily incessant and tedious labour of this method of agriculture must apparently lead to a certain amount of harvest, but very few kinds of men will undergo such work for the very moderate profit realized.

Remains of this system can be traced here and there wherever the Mediterranean race has penetrated. In the Pictish brochs of Scotland, for instance, swivels for tethering sheep have been found. The terraces or "lynchets" in England were probably built by those Early Neolithic immigrants who came from lands where vineyard terraces and irrigation were the immemorial system of cultivating the soil. In Braunton Great Field (Devonshire), which is said to contain 365 acres, minutely divided and subdivided, there is perhaps a survival of a system still common in France, but utterly unsuited to an energetic and economical working of the land. This method is characteristic of the East, of the Mediterranean race, and of all countries where rice is grown in the valley flats and hillsides, but it was quite unsuited to any vigorous race of savages who lived in a forest-clad or jungle-covered country. To them at first the land was worth nothing. It had no site value, and seemed inexhaustible.

They adopted a rough and crude system of a very much simpler character. The scrub, forest, or jungle, was cut over, allowed to dry, and then burnt. On the ash-covered soil, a crop of corn is raised, and again, for a second, third, or even more years, until the soil is utterly worn out. Then it is left to itself and grows brushwood,

or even forest. If population is increasing, it will probably be cut over again in ten years or so. This method is used all over the world in out-of-the-way places where forests still exist. It is common in British India,[10] in the Malay States, amongst the Lolas of Western China,[11] and in Borneo.[12] I have myself seen it practised in Madagascar and in the Sierra Leone Hinterland. It is also used in many other parts of Africa, as, for example, by the Awisa near Lake Bangweolo.[13]

But it is not generally realized that almost all temperate Europe was once covered by thick scrub or forest. When the first Neolithic people came in along the Mediterranean shore, they carried on the immemorial minute intensive culture to which they had been accustomed from time immemorial, and used the forest only for grazing animals. But when the Alpine race, and, still later, the "Celts," entered Europe from the east, they began to burn the forest exactly in the manner described above. Tacitus, with extraordinary insight, perceives the difference in character involved in these utterly different methods of agriculture. In fact, during Cæsar's invasion of Britain, the Celts were burning the forest to grow corn. In Russia this same method was used until quite recent times, for Sir Mackenzie Wallace describes it as still in use in Russia as late as possibly 1870.[14]

By the modern Scotch and English system of farming, which is a combination of these two primitive systems, the land yields the largest harvest. That is why it is the modern system. In America it is extremely curious to find not only an independent centre of invention, but these same two systems of agriculture, which seem to have developed on strictly parallel lines. Of the American plants, the following are perhaps the most important: Maize, Scarlet Runner, and Vegetable Marrow, which seem to be natives of Mexico or Central America; Groundnut (*Arachis hypogea*), Manioc, Potato, Canavalia, Kidney Bean, and *Phaseolus lunatus*, Pumpkin, and

Tomato, which come from Peru[15] or Chile, which was in part conquered by the Incas.

There is but one plant which has not yet been traced to Mexico or Peru. This is the Jerusalem artichoke, said to be a wild species coming from either Brazil or New England. It seems, then, that in Mexico and Peru there was a centre of developing civilization almost as important as that of the Old World. Not only so, but they understood the use of manure, and carried out works of irrigation on a scale quite comparable with that of Mesopotamia or of Egypt. Those of the Incas are well known, and need not be mentioned further. In the Animas Valley (Mexico) there are remains of a prehistoric dam 5½ miles long, and 22 to 24 feet high, and which included some 8,000,000 cubic yards of earth.[16] But in America the rougher method of burning the jungle had been in progress, and probably long before the voyage of Columbus. On the Lower Mississippi, in Mexico, and also near the boundary of Peru and Bolivia, cane jungle or other forest was burnt off by the Indians in order to grow crops of maize and other vegetables.[17] These places round and near the spheres of influence of Mexico-Peru correspond for America to the ancient British forest-burning in Sussex when Julius Cæsar landed in England. In pre-Columbian times, however, the virgin forest of America had hardly been attacked by man.

So closely exact a parallel in development seems in the highest degree remarkable; but it is only one point in a very difficult question, which will have to be discussed later. To prehistoric man, whether in Europe or America, the winning of his harvest was a serious and a difficult matter. His tools were of the rudest kind. Barley was usually pulled up by the roots. The Ainu until lately reaped his corn with a mussel-shell. At Schussenried a boar's tusk split in half may have been the first sickle, for it seems that the earliest bronze sickles are modelled upon this.[18]

Harrowing in Ireland was managed by dragging branches over the ground. The branches were tied to a horse's tail. In Skye a rope of twisted bent or grasses was used, and women dragged it, passing the harness across the chest.[19] But a much more widely distributed system was in use quite recently in Bulgaria, as well as in Cyprus, Tunis, the Barbary States, and the Canary Islands. This was the "tribulum," consisting of thick planks into which some four or five hundred flint-flakes had been driven. This was dragged over the corn by horses.[20] The writer has seen threshing practised in Chile by a very ancient method. A herd of brood mares was driven round and round in a circle, and in doing so hammered out the corn with their hoofs. This, of course, is a practice brought by the Spaniards, who learnt it perhaps from the Phœnicians; but in Palestine oxen were used for this operation.

Perhaps even more ancient is "graddaning," apparently seen by Robertson in actual use about 1778 in Scotland. Two women sat down on each side of a fire. One of them took a handful of straw and lighted it, so that the chaff burnt off, throwing the straw over her shoulder. The other kept the fire burning and raked out the ears of corn.[21] It is possible that at first corn was simply steeped in water, and not ground at all.[22] There is a custom in Roumania of offering corn only softened in water, which may be a survival of some very ancient custom; but this is perhaps unlikely, for, as we have seen, the Australians understand how to grind corn, though they have no agriculture.

The first mill would be any convenient flat rock, and the corn spread upon it would be crushed and bruised by a round stone. Amongst the Argentine sandhills Hrdlicka and Ameghino found certain stone "mullers," which were oblong, and showing marks of blows at the tips. These resemble exactly the Neolithic mullers found in Scotland (also on sandhills), and were perhaps used for pounding corn in a hollow of the rock or on a flat stone.

But a much more effective arrangement for grinding meal or flour is the quern. This consists of two circular stones. The lower one was fixed in a wooden frame. The upper had a small hole, in which a short stick was fixed. One woman, holding this stick, turned it like a millstone, and so ground the meal.

These primitive mills date back to the Copper Age, at least, in Silesia. Yet they were said to be employed as late as the eighties both in Roumania and, perhaps, in

FIG. 19.—NEGRITTOES SHOOTING FROM THE BOAT AT FISH IN THE WATER. (FROM A PHOTOGRAPH.)
(Frobenius. *Childhood of Man.*)

Shetland. They were only replaced when the regular water-mill came into common use. In Skye the miller who had obtained the right to grind corn for certain estates was permitted to visit the cottages and break the querns.[23] These survivals show how difficult it is to introduce even obvious improvements in domestic and agricultural work.

If we turn back to the very first beginning of agricul-

ture, one is astonished that early man, accustomed to a free and wandering life, ever managed to settle down to the steady daily grind of cultivating his garden.

The "old men" in Australia, when threatened with starvation by the natural increase in population, endeavour to limit the birth-rate. Elsewhere infanticide is regularly practised. The great men who first insisted on agriculture were not bound to do so. These other policies were much simpler, much easier to carry through, for they did not require the continual worrying insistence which alone could keep the first gardeners at their work. The result of field-work is to produce an invaluable character—patient, plodding, and contented, gifted with that agricultural calm and an obstinacy which has already transformed an enormous proportion of the earth's surface.

1 Krapotkine (*Mutual Aid*, 1902) explains fully the importance in human evolution of action and reaction between human beings.
2 Sparkman, Publ. Univ. California, Am. Arch. and Ethn., 1908.
3 Boas, Smithsonian Inst. Publ., 1895.
4 Scott Elliot, *Romance of Savage Life.*
5 Skeat and Blagden, *loc. cit.*
6 *Geog. Jour.*, May, 1913.
7 Piette, *L'Anthropologie*, 1903.
8 De Morgan, *L'Anthropologie*, 1902.
9 Fischer, *Arch. f. Anthrop.*, 1909, p. 246.
10 Risley, *Tribes and Castes of Bengal.*
11 *Romance of Plant Life.*
12 Hose and Macdougal, *loc. cit.*
13 Moubray, *In South Central Africa*, 1912.
14 *Russia*, 1912.
15 Costantin et Bois (*Rev. Gen. Bot.*, 1910) found in Peruvian tombs at Ancon also Lucuma and *Cherimolia*, four kinds of maize, Xanthosoma and *Gossypium Barbadense.*
16 Hough, Bur. Am. Ethn., Bull. 35, 1907.
17 Swanton, Bur. Am. Ethn., Bull. 43, 1911; Lumholtz, *Geog. Jour.*, 1903; Nordenskjold, *Geog. Jour.*, August, 1906.
18 Seyffert, *Arch. f. Anthrop.*, 1911.
19 See Proc. Roy. Scot. Soc. Ant., 1879-80.
20 Pittard and Verneau, *L'Anthropologie*, 1902.
21 Proc. Roy. Scot. Soc. Ant., 1897.
22 Fischer, *Arch. f. Anthrop.*, 1909, p. 246.
23 Proc. Soc. Ant., Scot. 1885-86.

CHAPTER XIV

THE OCCUPATION OF THE WORLD

THERE is a general law in the distribution of human races which is quite obvious when once it is pointed out, and which throws a great deal of light on the first wanderings of mankind. The most primitive and least advanced races are always found at the uttermost ends of the earth; sometimes also in refuges or misery spots, such as the dense obscurity of a tropical jungle, in almost waterless deserts, or occasionally in the innermost valley complexes of a great mountain-range. Such places are disdained and disliked by more particular people, and so the less advanced are allowed to hold them. Those races which live nearest to the North Pole are all primitive. The Eskimo still live on the spongy tundra or in miserable birch-scrub country, hunting the seal, musk-ox, and reindeer. They possess probably the first of all the varieties of *Canis familiaris.* Even in extreme North-Western Europe, the Lapps, who still keep their reindeer, are the least advanced of all European nations.

In the Old World the southerly tips of Africa and Asia are all in part occupied by very primitive races. So also are all those islands which are farthest south.

In South Africa there are Bushmen, in Ceylon there are Veddahs (Dravidian pygmies), in the Andamans a real negritto pygmy, in Malaya both negritto and Dravidian pygmies; New Guinea and the Philippines have their negrittoes and Celebes, and possibly several other islands have the Veddah variety. New Zealand is an exception, for the Maoris are Polynesians, who have

dispossessed an earlier race. The Tasmanians were originally supposed by Huxley to be negritto pygmies, but they are neither negrittoes nor pygmies.[1] They are now extinct in consequence of a fatal incapacity to realize that sheep were not a peculiarly innocent form of wild animal, and also because of their savage cruelty towards the wives and children of the earlier colonists.

They were of medium height, with dark negritto-like hair, very broad nose, and retreating chin. But they were not prognathous; and there is one marked peculiarity of their skull which is of an even earlier and more ape-like affinity than the brow-ridges of the Neanderthaler. This is the medial crest or ridge along the upper middle line of the cranium. It is not nearly so sharp and prominent as the similar crest of the gorilla, but is obviously an ape-like character. As we have already seen, this feature occurs in a very faint way in the modern Eskimo.

Professor Sergi, in a very interesting paper, shows that this peculiarity occurs not only in Australia, but in New Zealand and in many of the South Sea Islands (Marquesas, Tahiti, Dawson, Woodlark, New Pomerania, and Easter Island).[2]

He supposes that man originated in South America, and migrated by way of Antarctica—then a fertile sylvan country, with running water and song birds—into Australia and Tasmania. For reasons given above, we cannot accept South America as the birthplace of mankind. The Tasmanian may spring from one of the very first branches of the original race of man. Everywhere else, this early type has been, so to speak, mopped up by later varieties.

The Australians may be (see p. 156) another later variety, perhaps of the same race as the Neanderthaler, or rather a descendant of the common ancestor when he was at the same early stage of evolution as the Neanthaler of the European Ice Age. Amongst the Australians there is still evidence of the Tasmanians, whom they

assimilated. But the former have developed many rather advanced characteristics. The old men have formed a kind of Shaman oligarchy, and invented marriage systems and affinities which seem to require extremely abstruse explanation.

But in this chapter we wish to explain, so far as this difficult question is possible, the earliest migrations in Europe; and to do this, it is best to try and trace any possible remainders of the Palæolithic inhabitants of Europe before the entry of the first Neolithics. We left the Aurignacians, or rather Magdalenians, in the South of France. They were succeeded by a people called *Azilians*, who were certainly in Europe just after the reindeer had retreated north, and after the Steppe animals had gone to the east and who lived on the red deer (see Chapter XXI.). To make the general history of European migration clear, it is important to know how far these Azilians occupied Europe, and who they were. Europe, as the Ice Ages passed away, would be, over enormous areas, a dense forest. In this Red Deer, Urus, Bison, and Moose must have lived all through the Neolithic, for they were still in Europe in Early Historic times. We have suggested that the forest horse may have also survived. Now, the Azilians were accustomed to hunting just these particular animals, and there is really no reason to infer that they died out.

They probably formed only the merest sprinkling of a population, with perhaps one family in every 10,000 acres. There is no proof of this, but we could hardly expect to find any, for they would not live in caves, and would borrow the weapons of their neighbours. They would as a rule avoid the Early Neolithic settlements and, as we shall see, they reached Scotland and Scandinavia. As we have seen already, the Magdalenians (or Aurignacians) were not a pure race, for they had crossed both with the Neanderthalers and with the "negroid" pygmies (see p. 161).[3]

These Azilians, so far as one can tell without any

definite evidence, were the remnants of the Aurignacians or race of Cromagnon. They would in that case be tall, long-headed, strong-chinned, and vigorous—in fact, quite a fine type of hunting savage. But the really difficult point is to know whether they were blondes or brunettes.

We find afterwards in North-Western Europe a tall, long-headed, strong-chinned, muscular race, the forefathers of the fair-haired Northerners, *Homo Europæus* of Linnæus, the "greasy seven-foot giants" of Roman times—that is, our own Anglo-Saxon, Scandinavian, and Teutonic ancestors.

No one has ever ventured to find any other birthplace for the Northerner than this particular part of Europe. Moreover, there are distinct similarities between the early Swedes and the race of Cromagnon.[4] We will, therefore, as a working hypothesis, suppose that these Azilians were of the race of Cromagnon, and were fair haired and blue-eyed, and that they lived all over Northern and Western Europe, chiefly in forest country, but especially by the rivers and on the seashore, and became in time the Northern European. But their territory was slowly being encroached upon by other races. The first of these new-comers were the dark, round-headed, or brachycephalic, folk who have been mentioned in Chapter XII. They may be, as we pointed out, descendants of the men of Solutré, who lingered on in Switzerland and occupied the first lake dwellings.

So far there had been no serious attempt to occupy Europe. None of these people had either domestic animals or cultivation, and could not seriously develop the country. But in Asia, as we have seen, domestic cattle and agriculture had utterly changed the prospects of humanity. Man had really made a beginning in his conquest of the world. Two different races, utterly different in habits, and as well as in their ideals of life, set about this tremendous undertaking. The open, apparently limitless, grassy Steppes of Central Asia attracted the

wandering herdsman, who, as we have seen, was a dark-eyed and dark-haired, broad-faced person with a round or brachycephalous head.

At first he probably wandered aimlessly, for the world seemed to him an unlimited ranch; but sooner or later he found himself obliged, by the competition of later arrivals, and by the increase of his own cattle and family, to follow one or other of the main highways of migration. From the northern side of our birthplace of humanity—that is from the southern shore of the Caspian—there is, or was then, a practically continuous grassland or Steppe leading eastward to Siberia, Mongolia, Manchuria, and then turning south-west into China. By this route successive swarms of Mongols, Tartars, Manchus, and the like, colonized China and even Corea and Japan (see p. 251). But for us Europeans, the westward route was more interesting. This led round the Black Sea and south through Roumania into the valley of the Danube. Thence their herds could find pasture and suitable country as far as the basin of Vienna. In Austria they were already more or less confined and limited by the forests of Central Europe covering the mountains of Bohemia and Galicia. There is, however, a certain amount of rich pasture and more or less open country along the valley of the Inn; but when they had arrived at Passau, further wandering westward *as a horde* would be impossible. What happens to a nomad race which has to change its habits and settle down? They probably built villages and began to burn the forest and cultivate a little corn. They kept pigs to feed in the forest, and perhaps bred horses. They had also to try to defend their cattle against the neighbouring savages and against each other. We will leave them for the present in the act of settling down all round the head-waters of the Danube. But the result of this movement of peoples, which seems to have gone on with hardly a break from even Palæolithic times until the invasion of the Turks, was to settle a nearly continuous chain of dark-

haired, dark or brown-eyed, round-headed people all the way from the Pamirs to the Cevennes and Spain, where the Basques are perhaps the most westerly branch of this group. They may have occupied Monte Carlo, for a Furfooz type occurred at Bas Moulins. In Roumania and over Russia as a whole, the main population seems to belong to the same typical dark brachycephalous type which still exists nearly in its original home at Turfan, Turkestan.

A human migration is like a river in respect that it exerts pressure on its banks, and this main current of round-headed folk led to great changes in the whole of Northern Europe. It seems that there existed, even in Palæolithic or Aurignacian times, an industry similar to that of Southern France somewhere between Central Siberia and Norway. Engravings on rocks of a very similar kind have been discovered in Central Siberia, West Siberia, on the Urals, and in Scandinavia. There is also a rather elegant form of harpoon found both in East Russia and on the Baltic. Who the people were who made these drawings are not known, but it is clear that they had no domestic animals, and did not cultivate the soil.

It seems that they were forced west and north by the pressure of the first brachycephalous invaders. At any rate, these earliest of Norwegians seem to have been the first to enter that country, and it is supposed that they came by the northern coast of the Baltic and were brachycephalic. If this is the case, they have nothing to do with our Cromagnon or Azilian people, who were hunters of the red deer. They were followed into Norway by the Lapps, who possessed herds of reindeer, and who were therefore in a higher stage of civilization—that is, a later wave of the same brachycephalous Asiatic stock.

We must, however, return to the first home of mankind to find the beginnings of another equally important grand invasion of Europe. Cultivation of the soil of

Mesopotamia led, at an extraordinarily early age, to the rise of villages, towns, cities, and civilizations. The first cultivators were in all probability the forefathers of both the Mediterranean race and the Semites—that is, a short dark and originally long-headed or dolichocephalic people. Their method of migration was absolutely different from that of the wandering herdsmen of the Steppe. They advanced from settlement to settlement, chiefly at first along the coast-line, but in later days along the river valleys. For the *petite culture*, which they preferred, requires good fertile land, which could seldom be found except along rivers, and especially near their mouths. The first comers possessed dogs and lived mainly on shellfish. In all probability they were fugitives or outcasts from the more civilized communities. The main route of the Mediterranean race was along the North African coast, through Spain, France (Brittany), England (Downs and Devonshire), South Wales, and Ireland.

They also reached Scotland, and especially Aberdeen, Inverness-shire, and the Lothians. Their stone monuments always, so far as one can trace them, occur in abundance where the land is rich and fertile. No one who realizes what a stone circle meant in the way of labour and direction can have the least doubt that they were a settled, douce, biddable people, very much under the thumb of their priests and rulers, and thoroughly civilized. It is strange to think that though they made their monuments in imperishable stone, their language, their records, and all details of their life have been utterly lost.

But they did not only reach the British Islands; they seem to have occupied the whole of the Ægean Sea, as well as Italy, Malta, Sicily, and Sardinia. A branch of their civilization may perhaps have extended north-east along the Black Sea, where the peculiar Kurgans may belong to a local development of the Mediterranean race. In course of time they seem to have entered France, also by the Rhone Valley, perhaps by the Saône, Seine, and

Loire. Their trade routes seem to have penetrated all Europe and in almost every direction (see Chapter XXIV). It is very difficult to realize the prosperous condition of the Mediterranean basin in the Later Neolithic period. There seems to have been no serious war, and everywhere peaceful penetration was proceeding into barbarous uncivilized Europe.

We have tried in the folding table to bring together some of the more important dates. We have done our best and can only hope that every date is correct, although this is too much to expect.[5]

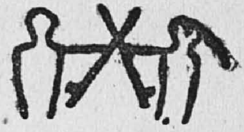


FIG. 20.

This Red Indian sign would be unintelligible, but represents a treaty of peace.

(Frobenius, *Childhood of Man.*)

It is unnecessary to describe the luxury and wealth of Crete, even at the early date of the first palace. Evans's researches show conditions of wealth and prosperity which are difficult to realize. Several kinds of religion flourished and faded away and there were also four or five schools of art which succeeded one another. But it is the extraordinary activity in commerce which impresses the imagination. The cuttlefish ornament of Crete has been found in Spain. A Mediterranean seashell was bartered to the savages of Pomerania somewhere about 2000 B.C. There is an unmistakable kind of pottery made in Neolithic Cyprus, about 4000 to 3500 B.C. There are incised marks on it which are filled with a white substance. This type has been discovered in Bosnia, Moravia, Poland, Bavaria, Belgium, Holland, Scandinavia, as well as along the Mediterranean to Portugal, and in Russia, the Caucasus, and Egypt.[6] Crete and Cyprus

B.C.	Ægean.	Austria-Hungary.	Mesopotamia.	Egypt.	India.	China and Japan.	England and Scotland.	Germany and Scandinavia.	France.	Spain.	Italy.	Greece.	Russia.	Crete.
8000			Cattle and corn											
7000														
6000														
5000														
4500			Chaldæa	Copper known										City life
4000			Sumer Tigris Akkad → Euphrates	4th to gold bracelet 3733, iron found 6th dynasty, Abi Sir										
3500			Semites	Southern →										
3000	Tin known		→ City States Profound peace	Copper, bronze, and tin; turquoise mines		Copper known				Bronze		Troy, 1st city: copper knives, tin, silver, lead		Minoan I.
2500	Copper, Cyprus	Copper	Sargon I. (2650) Iron, Chaldæa Arabs	2400, gold washing	Irano Indians, Punjab →	Gold, silver 2400-2200), bronze caldrons	Copper	Austria, (Mond, see) Copper			Bronze			
2000	Bronze; Phœnician activity	Bronze	→ Northerners (?) —Iron (?) Still prosperous				Bronze II.		Copper	Phœnicians in power	Copper daggers, silver	Troy, 2nd city: iron, silver		Minoan II., 1st palace
1900								Bronze II.						Minoan III., 2nd palace
1800									Bronze II.					
1700	Aryans → *		Aryan → *	✗ Etruscans and Libyans Hyksos → *			Bronze III.					Aryans → *		
1600				Silver common										
1500	Greeks → *		Hittites → * Assyria iron Hittites	Iron vessels	Aryans Iron, Punjab → * Dolmens				Bronze III.	Export of lead and silver by Phœnicians				Mycenean
1400			→ *	First mining map Libyan →			Bronze IV.					Acheans, iron sword		
1300									Bronze IV.	Celts → *				
1200	Cyprus-Phœnician Iron age Greeks		Syrians * Aleppo * Tiglathpilezer, bronze chariot	Rameses III.			Bronze V.							Dorian → * Iron
1100	→ Cyprus		Rise, Assyria and Babylon						Cadiz founded		Bronze, iron ↓	Dorian → Iron age		
1000			David		Iron common	Iron known			Bronze V.					
900			Arabs Iron (Ashur-banipal) Famine, Tyre Damascus destroyed											
800							Iron, Hallstadt I.		Iron, Hall-stadt I.	Iron age	Iron (swords)	Odyssey, iron, early monuments Scythian →		
700	Carthage founded										Iron age		Iron age	
600							Celts → *		Iron, Hall-stadt II.	Last Celtic invasion →				
500														
400						Skilled in iron			La Téne I.		Transition			
300							Voyage of Pytheas		La Téne II.		La Téne I. and II.			
200									La Téne III.					
100														
55							Julius Cæsar							

[*To face p.* 234.

happen to be better known. So also are the ancient civilizations of Hissarlik, Mycene, Egypt. But even at Malta there seem to have been a similar luxurious development of peace and prosperity. So also in North Africa, where the Neolithic population was enormous. All this seems to have been at first the work of the Mediterranean race. But a great change was approaching. However useful polished stone weapons may be in building pyramids and dolmens, they are not very satisfactory as weapons of war. It was the invention of copper, and especially of bronze axes, daggers, and swords that altered the whole history of Europe.

As will be seen from the table, these weapons of war had been supplied to the barbarians of Germany, Scandinavia, and France, by at least 1800 B.C. This was a fatal blunder. In 1700 B.C. ferocious fair-haired barbarians had already invaded the Mediterranean, and were destroying utterly every city worth plundering (see p. 377).

This is the first appearance in history of the modern *Homo Europæus*, the tall, blonde dolichocephalic race of Northern Germany and Scandinavia. Such were the Acheans of Homer, tall fair men with flowing hair. Such perhaps were the Amorites of Palestine, supposed to have been blonde. It was a later variety of these savage Northmen and Vikings who ravaged the shores of England during the Roman period, and who were only driven out of Scotland some seven hundred years ago.

But the black-haired *Homo alpinus* tribes had occupied the lake dwellings of Switzerland during the Neolithic period, and were, according to M. Hamy, the first Gauls. They had also increased in numbers, and may at this time have already colonized most of France. So that the result of the first invasion of France by Germany would be a struggle between the Northerner (*H. Europæus*) and the dark-haired *H. alpinus*. In the history of the lake dwellings the story can be more or less clearly traced. The original brachycephalic race is nearly replaced by a

long-headed people of the Northern type. But in course of time the percentage of round-headed skulls again increases, and in those parts of Switzerland where lake-dwellings existed, the population to-day is mainly *H. alpinus*, or a mixture of this and *H. Europæus*.

The description which we have given above may be tested against the theories deduced by various writers from the pottery and other relics of Neolithic and Copper Age in Germany. In Late Magdalenian times (before domestic animals and crops) a little collection of women's and children's heads was found at Ofnet. These heads are

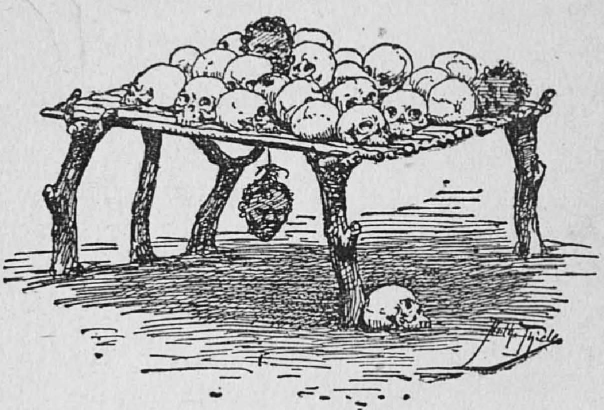


FIG. 21.—A TROPHY OF HUMAN SKULLS PRESERVED AT BUNKEYA. CONGO STATE. (AFTER STAIRS.)
(Frobenius, *Childhood of Man.*)

partly of Furfooz and partly of Cromagnon type. One had had a Neanderthaler ancestor. This seems to be the first record in Europe of an unpleasant kind of trophy collected by the earliest of the Celts in Europe. They were, in fact, head hunters, and for the same reason as the Borneans and a few Far Eastern savages.

Some early tribe, perhaps of Furfooz or dark alpine brachycephalous people, had collected specimens of their prowess partly from the hunting villages of the Azilian or Cromagnon stock, or partly from their own people. A mixture of the two races may, of course, have been in

progress even at this early date. In the Later Neolithic settlements in South Germany the people seem, like the lake dwellers, to be almost all round-headed, or brachycephalic. There are two types, one the original Furfooz, or Solutréan, and that of the later Asiatic invaders, which may be the true Alpine type.

But in the German Copper Age the Cromagnon type appears again (even the Neanderthaler strain has been found in them). Our Azilian hunters are clearly becoming a civilized people. They are associated with a rough pottery, the so-called "Bandkeramik" found at Rössen, also on the Elbe, Main, and Rhine, as well as in Moravia and Bohemia. From this time forward the Cromagnon type occurs continually. Even in the next Schnurkeramik their graves have a rich and wealthy appearance as compared with those of burials of the same time and place which belong to a mixed pygmy × Furfooz race. They were even then tall, vigorous, and muscular, and here and there the old Neanderthal type seems to crop up. They occur also in the Megalith, or Gangraber graves, in Scandinavia and North Germany, with the "Kugel Amphora" type, and right on into the Bronze Age.

A fresh, vigorously brutal and savage people had for the first time broken up and mixed with a fully domesticated, refined, and highly civilized folk. The same process was to be repeated over and over again all through the history of Europe. It reminds one of nothing so much as the manner in which a gardener prepares the soil in order to grow rare and—vigorous fruit. First a layer of rotting old sods, then perhaps rich loam, then lime and poor sand. All these layers are dug up and thoroughly intermixed, giving a ground capable of producing anything. It was to this sort of mixture of varied and totally distinct races that is due the origin of all the great nations of the world.

[1] The Tasmanians are described in full by Sollas, *loc. cit.*

[2] Sergi, *Arch. f. Anthrop.*, Bd. xi., 1912.

[3] One could not hope for more than an occasional Neanderthaler amongst them or amongst ourselves. M. Stolyhwo discovered very marked Neanderthaler features in Scythian skulls near Kiev (*L'Anthropologie*, 1905).

[4] Schliz. This author finds that the skulls of Alamanni and Frisians resemble that of Brünn, which is supposed to be a Neanderthaler × Cromagnon cross. Swedish skulls resemble Cromagnon (*Arch. f. Anthrop.*, 1908-09).

[5] The arrows represent roughly the course of invasions; when followed by asterisk this means that a clean sweep was made of previous civilizations.

[6] Chauvet, *L'Anthropologie*, 1901.

CHAPTER XV

THE OCCUPATION OF AFRICA AND ASIA

ALL men, whatever their grade of civilization, prefer not to undertake any unnecessary labour or hardship. So in the story of the first occupation of Africa we may in thought leave out all malarial jungle and arid desert. All that is left of Africa after this process ought to be the places most desired by mankind. It seems also that these same districts have been the regular highways of occupation and invasion. First, and standing out clear and distinct is the line of the Cape to Cairo Railway, with its chain of waterways and healthy, breezy uplands leading from Egypt to South Africa. The genius of Rhodes grasped the importance of this great highway of migration, along which we find in orderly series remnants of all the successive invaders. In the extreme south the *San*, or Bushman; next, in fertile South Africa the very best of the Bantu negroes, such as the *Zulus*, who are the solitary example of pure negro race which developed of itself, and, indeed, threw off from the centre of its civilization invading armies which went as far north as Angoniland.

It is only in Uganda that one comes to the first traces of the next series of invaders. The main population is negro, but the ruling race, or Wahuma, appear to belong to the great Hamitic family, which also includes the Masai, Galla, Somali, and various Nilotic tribes. Abyssinia is very imperfectly known, but the ruling class seem there also to be either Hamitic or mixtures of Hamitic-Semitic elements.

Farther up the Nile the Arab, or Semitic, partly pure, partly crossed with negro and Hamite, was, until very recent times, the ruling people. In Egypt there is at present an Anglo-Saxon control. From both sides of this main Cape to Cairo route weaker races have been pushed eastward or westward. In the north-east the Kikuyu were developing fast, though the pygmy still survived at Elgon and in the forests, and although the Masai nomads, with

FIG. 22.—AN AFRICAN STATUETTE (BALUBA).
(Frobenius, *Childhood of Man.*)

great herds of cattle, were occupying the fertile grasslands of British East Africa. In the south-east the worst of the negroes had been pushed more and more towards the unhealthy east coast. So also on the west, pygmies and negroes, unable to hold their own against the more vigorous new-comers, were driven into the dark recesses of the Congo River system, where one finds to-day a spiritless, hopeless, type of African, so harried and worried by cannibal negroes, by Arab slave-traders, and by the

rubber companies' agents, that they seem unable or unwilling to save themselves from extinction.

Another great highway extends westward from the Nile to Northern Nigeria; it runs between the Congo forests on the south and the Sahara on the north, and has been always a regular entrance-road for new peoples and new civilization. Here, again, pygmies used to live on the Upper Niger in the days of Herodotus, and there probably are pygmy strains amongst the pagan mountaineers in Northern Nigeria. It seems certain that the basis of the population remains all along this route, from the Nile to the Niger, of the characteristic negro type.

The origin of the negro is in the highest degree mysterious. Many negroes seem to us to show distinct traces of the pygmy. Wherever they are, or have been, living in contact with Hamitic or Arab people, there are always distinct traces of crossing. But this does not explain the original type of negro, which remains as mysterious as ever. Was the Chellean, who certainly left his tools lying about all over Africa, the first type of negro, and on the same grade as the European Neanderthaler? The differences between the various types of negro are distinct enough when the most distant and most typical tribes are selected. There is the Eastern type (of Ankerman),[1] with their cattle, leather shields, skin clothing, and round huts, who live on Kaffir corn and cereals. These have the same two races of cattle which existed in other parts of the world—that is, the great long-horned Angoni ox (*Bos primigenius*), and the small, active, zebu-like beast —a form of *B. brachyceras*. The Western branch, living on manioc, banana, sweet potatoes, and yams, with rectangular huts, clothe themselves in bark-cloth or palm-fibre, and use the bow and arrow.

Yet are not all these characters purely due to a different manner of life? They hardly involve any difference in descent or of race.

In West Africa and Nigeria the basis of the population

is negro. The west coast tribes of the palm-oil country are the remnants—"ethnological sweepings"—of many different negro races which have been forced out of the more healthy and agreeable uplands of Haussaland. But the story of the various races which followed up the negro is complicated by the existence of Libyan and Berber influences, as well as of typical Hamitic and Arab invasions. According to Desplagnes and others, a large part of the Sahara was in recent times fairly well watered. The advance of the sand-dunes is responsible for much of the present desiccation. To this one might add also the influence of Mohammedan invaders, who in this part of the world, just as in all other countries conquered by the Mussulman, destroyed all civilization, however vigorous and however advanced.

On the view held by Desplagnes and others, then, the Neolithic Age in Africa rose gradually out of the Palæolithic, without any definite dividing-line between the two. One must imagine a continual series of peaceful villages, each with its little tract of irrigation and small herds of cattle, flocks of sheep, etc., extending from Egypt over most of the Sahara, but of course not entering either the tropical jungle of the west coast and to the south, or the mountains or those parts of Africa which were even then too arid for settlement. This state of affairs would be in existence in 2000 B.C., and for an indefinite number of years before that time. If the people were mainly negro, with many Hamitic elements, then those Begas who were the first to occupy Egypt would be but a specially fortunate tribe of one very widely spread civilization. But it is when one asks who are or were the Libyans and Berbers that the real difficulties begin to appear. Some Berbers are blonde, others dark and swarthy. There are at least two quite distinct explanations of the Berber:

1. He is a tall, blonde, dolichocephalic product of the Atlas Mountains. There is nothing improbable in this

view, for if the ancestor of *Homo Europæus* became tall and blonde in the northern part of Europe, there is no reason why his cousin, who remained in Africa, should not have changed after somewhat the same fashion. Sergi[2] still seems to hold this explanation, and this seemed to us, in 1906, the best explanation available. The Berber must have been in contact with the first Neolithic peoples, and probably learnt from them how to cultivate crops, and perhaps he raised some of their cattle; his subsequent history would be exactly parallel with that of his Teutonic cousins. There is no reason why such a tall, blonde race should not have held its own until the Arab invasion.

2. But the more usual explanation of the fair-haired, blue-eyed Moroccan and Algerian Berbers is that they are the actual descendants of invaders belonging to the northern race or *Homo Europæus*.

Of this view there are three variants:

(1) They came, according to Mehlis, via France and Spain, and swept eastward along the North African coast-line until they reached Egypt, which they attacked along with other marauders. According to this authority, they crossed the Straits of Gibraltar about 2200 B.C.[3]

(2) They are descendants of the northern race, but travelled via Asia Minor or Greece. The blonde children of Anak and the Amorites belonged to the same or a similar swarm of invaders, but their inroads were only in 1700 B.C.

(3) They are descendants of the 50,000 Vandals who left Spain for Africa in A.D. 429. These northern barbarians seem to have held the whole coast from the Bay of Syrtis to Morocco inclusive, and only lost their independence when conquered by Belisarius in A.D. 553.[4]

But we hardly think there were enough Vandals to make a permanent difference in the whole population of North Africa. Professor Sergi says that the blonde Berber differs from the northern race in other characters. Nor do we think that there is sufficient evidence that they

crossed to Africa by Gibraltar and travelled to Egypt via Algeria and Tunis. There was no particular reason for them to have remained only in Morocco or Algeria, and to have stayed neither in France nor in Spain, so that we cannot agree with either the first or the third variant. On the other hand, Egypt was certainly within the usual range of piratical invasions of our very early and excessively rude, blue-eyed ancestors, for it is quite clear that they reached Thessaly, Greece, and Asia Minor. There is a strong contingent of grey-eyed and brown-haired individuals in Greece, in the Balkans, and along the Danube, which is perhaps best explained by the passage or settlement *en route* of some of these northern invaders. Moreover, the Egyptian pictures, which are supposed to represent the Achæans or Libyan Berbers, remind one of the Greek, not in the least of the typical northerner. So it seems now more probable that a band of ferocious mercenaries, amongst whom were certain tall men of mixed descent (Northern × Alpine), attacked Egypt and invaded North Africa.

The blonde Berbers, then, may be descendants either of these invaders or of the Vandals. Yet the older theory that they are remnants of a very ancient race allied to the original Aurignacians, the ancestor of *Homo Europæus* may turn out after all to be correct. There should be caves or other deposits in hitherto unexplored Morocco which may yet prove it to be the best explanation.

But the history of Egypt has many other incidents more important than the attacks of savage barbarians, whether Mongols, such perhaps as the Hyksos or fair northerners. The first Egyptians seem, according to most authorities, to have been a peaceful Hamitic race, whose usual occupations were very similar to those of the Nilotic tribes living to-day much farther up the Nile. The dynastic Egyptians became powerful after a vigorous people, bringing with them cattle, sheep, and a knowledge of architecture (perhaps of hieroglyphic writing), entered

the country, and, fusing with the Hamitics already settled there, formed the Egyptian type, which seems marked and distinct from that date—3200 B.C.—until our own times. Farther up the Nile this type becomes increasingly negroid, and to the east more Semitic, which is exactly what one would expect.

This new race in Egypt was surely the Mediterranean race or its forefather, and later on extended westward along the coast. This is the dolmen race, and it is represented to-day by the brown-eyed, dark-haired Kabyles, who seem to have been of the same origin as the Libyans.[6] It is true that Scylax, who wrote in 508 B.C., said that the Libyans were "blonde, sober, and very beautiful." But that was 1,700 years afterwards, and may we be excused if we point out that, though the northerners were blonde, beauty is purely a matter of taste, and we doubt if anyone could honestly consider sobriety as a special characteristic of *Homo Europæus*. Along the road, now hardly passable, which leads from Egypt to Carthage and so on to Tunis, Algeria, and Morocco, there is a profusion of dolmens and stone monuments, testifying to the passion for monumental masonry which distinguished the Mediterranean race. Even to-day the Kabyle still sets up stones, but not apparently in those districts that are inhabited by the blonde variety of the race.

Near Timbuctoo, there are at Killi Goundann the ruins of 300 villages, as well as a truncated pyramid. Small figurines in copper and terra cotta of ibis, crocodile, etc., have been found there. At the death of the King, his body was laid on a carpet in a wooden dome. Arms, ornaments, dishes, and drinking-vessels in abundance were provided. Besides materials, labour in the form of cooks, butlers, and other human victims was provided. A hill of earth was formed covering the whole, and then a great fire lighted on the top.[7] Can this have been the burial of a great chief of the original Mediterranean race?

There is much in this account that reminds one of what used to happen in China, in Japan, and in Mexico (see p. 386). In any case, however, the dolmen builders once extended to Senegambia, and perhaps seriously affected the population of Northern Nigeria. The Libyo-Berber civilization is given by Palmer as existing from 500 B.C. to A.D. 406 in the Hausa States of to-day. These were raided by Yemen Arabs about A.D. 900, and in A.D. 1000 by some alien race; again in 1349-1385 by the Mandingoes.

Hence the difficulty of tracing the story of prehistoric man in North Nigeria.[8]

The backwardness of Africa is perhaps due to two obvious disabilities. Except in South and South-East Africa, and along the Mediterranean coast, almost the whole coast-line is either mangrove swamp, dense forest, or barren desert. Hence there was hardly any attraction for the more advanced races to establish themselves. The second disadvantage was the manner in which the whole continent lay open to the Mohammedan invasion. From Egypt there were three roads which all led, with hardly any natural obstacle, right into the very heart of the Dark Continent. These roads—Cairo to the Cape, Egypt to Morocco north of the Sahara, and Khartoum to Timbuctoo south of the Sahara—are being opened up.

It is only in our own times—indeed, only last year—that, by the fall of Tripoli, Christianity has encircled the whole continent, and lies across every outlet of the slave caravans. Africa has an opportunity now; hitherto she has never had a chance of developing. Only once in prehistoric times does there seem to have been any attempt to develop Africa on strictly reasonable lines. That was when some prehistoric people set the natives to erect the great stone monuments at Zimbabwe and elsewhere. The same race probably worked the old mines, said to be abundant in Rhodesia. Who they were is quite unknown. The date, so far as our information goes, is equally uncertain. We personally find it impossible to believe that

a negro King indulged in this sort of monumental masonry and worked the mines, but have no satisfactory explanation to offer.

[1] *Arch. f. Anthrop.*, 1905-06.
[2] Sergi, *L'Uomo.*
[3] Mehlis, *Arch. f. Anthrop.*, 1909.
[4] Mehlis, *loc. cit.*
[5] De Regny, *Libya Italica.*
[6] The following characters are given by Mehlis, *loc. cit.*, as showing the affinity of modern Kabyles with the dolmen builders and the new race of Petrie :

	Head.		Cephalic Index.	Height to Breadth Index.	Capacity of Brain.
	Length.	Breadth.			
New race in Egypt	180·5	132·5	74·1	85·0	1,298-1,315
Dolmen builders ...	184·5	137·5	74·4	85·5	1,310
Kabyles	179·0	133·0	74·3	84·7	1,346

See also Capart, *L'Anthropologie*, 1904, p. 414. If we suppose that the original population of Egypt was Bega or Hamitic, then the new race would consist also of Hamites modified and invigorated by a strong tincture of Semitic blood. The Mediterranean race might be as here suggested : (Asiatic Hamite × Semite) × African Hamite. *Cf.* Seligman, *Jour. Roy. Anthrop. Inst.*, vol. xliii., 1913.
[7] Desplagnes, *L'Anthropologie*, 1903, p. 151.
[8] Palmer, *Jour. Roy. Anthrop. Inst.*, 1908.

CHAPTER XVI

ASIA

FROM the birthplace of humanity, which is also the point of origin of the great religions, there are, as we have already suggested, two main highways leading to India. Bacchus, Alexander, a whole series of Asiatic conquerors, as well as apparently the so-called Aryans, followed those famous passes which traverse the north-west frontier of India.

"The hymns of the Rig Veda are the lyrical heart-burst of the devout joy of the Aryans when, after their weary wanderings through the inhospitable uplands of Persia and Afghanistan, they at last stepped down into the immense, extended, well-watered and semitropical plains of the Punjaub."[1]

According to some authorities, this invasion took place about 2000 B.C.,[2] or perhaps in 3000 B.C. (Fergusson). Yet that is a very recent date if we try to discover when the very first men lifted the "purdah" of British India. The first invaders were perhaps the negritto pygmies, who may be the apes which fought in the armies of Bacchus, and are represented to-day in many dark-skinned hunting tribes. Later on they were apparently followed by the Veddah pygmy, who were long-headed like their Aryan successors.

It is perhaps simplest, and, so far as we can see, quite a tenable proposition, to suppose that the Veddah pygmies were the very first branch of what used to be called the Caucasic stock—that is, an extremely primitive twig of the ancient tree to which we ourselves belong. We must

look upon them as separating and wandering east long before the invention of agriculture. They no doubt gradually occupied those jungles which were not then in possession of the negritto pygmy. (As mentioned above, these are quite distinct from the Veddah.) According to the usual view, they occupied Ceylon, the Philippines,

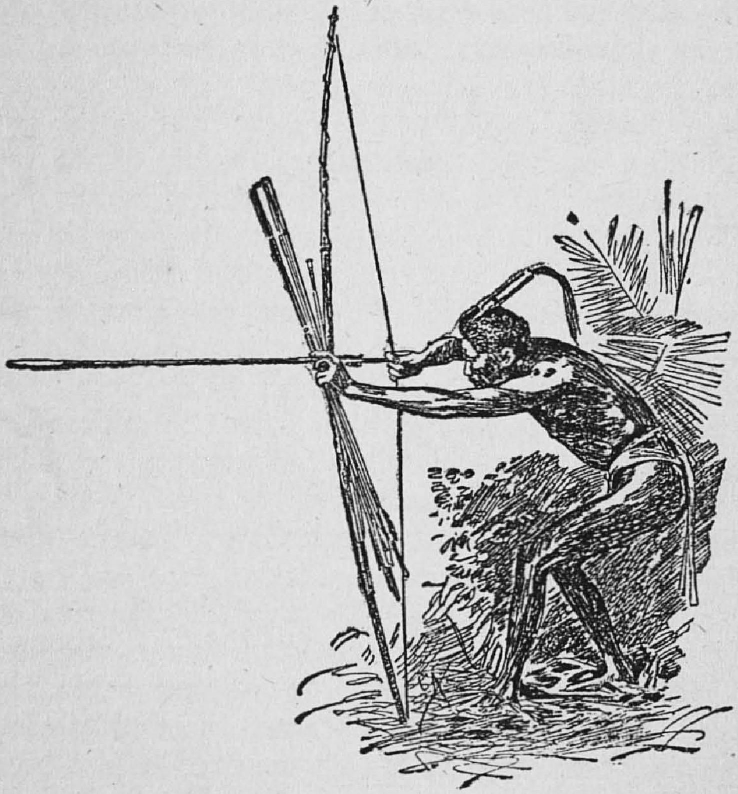


FIG. 23.—A NEGRITTO, AETA, SHOOTING WITH A BOW. (FROM A PHOTOGRAPH.)
(Frobenius, *Childhood of Man.*)

Celebes, and other islands *before they had been separated from the Asiatic mainland!*[3] In the recesses of the jungle the Veddah still lives in rock shelters and caves, the husband of one wife, wonderfully truthful, temperate, and chaste, but without apparently the slightest energy or initiative.

There seem to have been several other swarms of immi-

grants belonging also to the main Caucasic stock—that is, with wavy hair, a white skin, more or less beard, and hair on the face and features that sometimes remind us of ordinary European faces.[4] These successive waves of migration have not yet been distinguished from one another, but there were at least two or three of them. A very early hunting series is probably represented to-day by some Dravidians in India (Gonds, Santals, etc.), and as far north as Japan by the Ainus, who are one of the most interesting of all Asiatic tribes. No doubt people of this Caucasic stock used to live in many of the forests and more open lands between Japan and British India. Of these earlier hunting Caucasians, the Ainu of Japan are a particularly interesting people. They are good canoe-men, and not afraid of the dangerous seas, in which they spear fish, using the detachable harpoon-head, not unlike that of the Magdalenians. There is a strange mixture of veneration, fear, and delight in their methods of hunting the bear which has led to some very curious confusions of superstition and hunting lore. Nor are they without a touch of artistic imagination. This is revealed in their ornaments, their ceremonial rites, and in their stories. There is especially an exquisite tale of a brave and handsome young Ainu who followed the magnificent bear which he was hunting into a great subterranean cavern. Still tracking it, he eventually found himself in Hades, but discovered to his disgust that he had become a serpent.[5]

But these early hunting Caucasians were apparently followed by another swarm in Neolithic times. Physically these later comers were allied to the Mediterranean race, and they had the same passion for monumental masonry on c large scale, and the erection of dolmens, memorial stones, and the like. Such dolmens are extremely common in some parts of India; indeed, as we shall see, certain Indian clans still erect stone memorials. Stone monuments of the same megalithic character occur in many

other parts of Asia, especially in Japan. Even in Easter Island, the farthest east and most remote of the Pacific isles, there are monoliths of stone.

These early Neolithic invaders were probably long before the days of the Aryans (see p. 234). These first attempts at the occupation of Asia started always from the north-west frontier of India, and consisted of the following:

First, a Tasmanian occupation, corresponding perhaps to the Piltdown level, and occupying Australia and possibly the more tropical islands; second, the Australian type, which seems to have only developed in Australia, for there is no trace of it elsewhere; third, the negritto pygmy, who kept to the tropical jungle and has been driven into the innermost hills of the great islands; fourth, the Veddah, the vanguard of the Caucasic race. Then came several advanced guards of the Caucasic, of whom the Ainu in Japan seem to be the most north-easterly outpost. The main body of the Caucasians came in the Neolithic dolmen time, and possibly spread over a large part of Polynesia (see pp. 252, 342).

All these seem to have come across the Indian frontier, and thence by Indo-Malaya and the great islands up the coast. But there was another great stream of immigrants coming by a totally different route. As we have already mentioned, hordes of brachycephalic invaders had from the beginning turned eastward by the route of the Siberian railway. Having reached a fertile country in Manchuria and perhaps Mongolia, they seem usually to have settled down for a while; but when they had multiplied and increased, they invaded the rich, peaceful, and industrious populations of ancient China.

But in China the enormous area of cultivable land, the millions of population, and the ancient date of their civilization, seems always to have dissipated and dissolved away the effects of every invasion. It is quite unnecessary to give the names of the various Mongol barbarians. All seem to have come very much by the same route, which

the Great Wall was supposed to guard. The most recent seem to have been the Kitan Tartars (A.D. 1122), those of the Golden Horde (A.D. 1129), and the Manchus (A.D. 1662), whose expulsion as a dominant dynasty dates from the last two or three years.[6] From Manchuria, a different line of invasion passes via Corea to Japan. It will be seen that, from Japan in the north to Burmah in the south, there is a continual series of contacts of the Caucasic stock from the west and south with the Mongolian coming down from the north and east. The Lepchas and other tribes of Nepaul and Sikkim are Mongols or slightly crossed; but in Burmah, the Malay Peninsula, Siam, and Annam, there is an extraordinary mixture of various invasions of Caucasic people, who are crossed with, and hardly hold their own against, brachycephalic Mongols. These also belong to several distinct swarms, and many are by no means purely brachycephalic.

It is just the same in all the islands, from the Philippines to Java and Sumatra. Moreover, as we have seen, the negritto pygmy element still holds out, both in Malacca and in some scattered places. It was, so far as we can see, Logan who, with remarkable insight, picked out the guiding clue to the extraordinary mixture of races which exist in this part of the world.

He believed that both the Malay and the Polynesian were crosses of the original Caucasic with one or other of the Mongolian, or brachycephalic, invaders. As both Malays and Polynesians are bold seafarers, they have distributed themselves far and wide. Australia is influenced by the Malay, and the Maori of New Zealand is a Polynesian. Even in Madagascar the basis of the population is of some early colonizing people akin to the Burmese. These canoe people everywhere force the older races up the rivers into the jungle-covered interior of Borneo, New Guinea, and the other islands. The question is too complicated to be attempted in any detail, but there are a few little points which must be given, as they

seem to throw light on the American puzzle. Let us suppose that this Caucasic element had attained to the stage in which it worked out astrological problems, such as the rising and setting of stars, and represented these in the form of stone circles, etc., before this race was isolated and broken up by Mongol barbarians.

Could we expect to find any remnants of the original type in a pure condition? We know what happened to the original Neolithics of the Mediterranean race in England, in North Africa, and in Brittany. They were scattered—forced into the most out-of-the-way places; the very remembrance of them as a great civilizing and civilized nation has utterly perished. Moreover, Celts (Gaels and Brythons as well as Gauls), who were crosses of the Alpine and North European race, not only occupied the land which the Neolithics were the first to cultivate, but have been given the credit of erecting the stone circles. The only memorials of the Neolithic Mediterranean race in Western Europe are the stone monuments themselves and their descendants, very seldom unmixed with their conquerors, and who still exist among us. If this happened in Europe, we would only expect to find in Asia the stone monuments and occasional traces of Caucasic blood amongst the invaders. There is, as a matter of fact, a nearly continuous chain of megalithic stone monuments from India to Japan, and as far as Easter Island. The Caucasic strain does exist in the Polynesians; indeed, Sergi (in *L'Uomo*) describes the Polynesian as "*Notanthropus eurafricanus polynesianus.*"

The dolmens in China and Japan seem to have been always covered with mounds of earth. Their entrance avenues are usually oriented to the south, but not exactly with a deviation of 10 degrees either west or east. The Japanese are said to have been in the Bronze Age when they first colonized Japan, having probably steered for Tshushima Island, which is visible from Corea. But if the reader compares the account given on p. 245 of a West

African hecatomb of the same character, the resemblances are surely very remarkable.

The prehistoric pottery of the Stone Age in Asia may perhaps some day throw light on the former existence of a widely spread Neolithic people, mainly of Caucasic descent and allied to the Mediterranean race, and which settled chiefly on the rich and fertile lands. There is a strong resemblance, according to Joyce, between the Stone Age pottery of New Guinea and that of Japan, and the process of manufacture seems to have been similar.[7] It is from facts like this, when there are sufficient of them, that a satisfactory explanation may perhaps be obtained. The Melanesians are possibly mongrels of negritto pygmy with Malays, who are themselves crosses of Caucasic × Mongol. These extraordinary mixtures of varying peoples in different stages, with their continual warfare and piratical invasions, are now being brought under civilized control. If we look back on Europe at about 1500 B.C., the state of affairs seems to have been very like that of most of Indo-Malaya twenty years ago.

[1] Sir George Birdwood, *Jour. Soc. Arts*, August 23, 1912.

[2] Ujfalvy, Grunwedel, *L'Anthropologie*, 1901 and 1902.

[3] *Cf.* Sarrasin, *loc. cit.*

[4] Sergi's *Notanthropus eurafricanus* seems to correspond very closely to the Caucasian stock—that is, to the original white man, as distinguished from the yellow, the black man, and pygmy. But he describes the Veddah as Pygmæus. We have followed Turner in including the Veddah and his allies in the Caucasic or Indonesian group (see Sergi, *L' Uomo*, 1912, and *Man*, 1908, p. 23).

[5] See Scott Elliot, *Romance of Savage Life*, p. 360; also Chamberlain and Hitchcock, Smithsonian Report, U.S. Nat. Museum, 1890.

[6] Giles, *Civilization of China*, 1911; *China and Manchus*, 1912.

[7] *Jour. Roy. Anthrop. Inst.*, December, 1912.

CHAPTER XVII

THE AMERICAN PUZZLE

PATRIOTISM is one of the great motive powers in the ascent of humanity; usually stimulating, inspiring, and ennobling, and yet, in the story of man, it is at times most inconvenient.

This is especially true when a purely scientific problem is discussed by men of different nationalities. One or two puzzles in anthropology really seem to be turning to a species of international warfare, though fortunately hitherto they have been conducted only in print. But in the problem of American origins, the desire to owe nothing to the Old World has led to complications, and a point of view which it is really very hard to understand or sympathize with. It is fortunate that we were able to say with a clear conscience that the ancestor of all the primates was in our opinion a native of North America. For we are obliged, on the strongest evidence, to hold to our opinion that the first man was an inhabitant of Asia, or rather, of what is really the meeting-place of three continents. This hypothesis must, of course, be either accepted or rejected. If it is taken as a working plan, then it is clear that as America was inhabited before the days of Columbus; the problem is only to know how and when man entered the New World.

This problem can be attacked in all sorts of ways. The actual bodily structure of American man must show some trace of his Asiatic forbears if he entered from Asia.

Then, again, there is a geographical side to the question. By what route did these earliest colonists travel?

There is also evidence from culture, customs, myths, etc. If man did enter America from Asia, there is a strong antecedent probability that he kept up, more or less, something of his personality, and carried on those habits and customs that arose out of his disposition and past history, however much he modified them in a world which was quite new. The geographical problem should perhaps come first. The forefathers of the Eskimo, perhaps the survivors of the Magdalenian period (of Europe *and of Asia*), were gradually forced into the north-east corner of Asia. Farther north lay cold and inevitable starvation, to the south and west were forests unattractive in every respect, and already infested with fierce Mongolian savages, better armed, and yearly becoming more numerous.

So these original Eskimo seem to have hardened their hearts, launched their kayaks, or skin canoes, and paddled across to the New World, which would be at times distinctly visible to them. They may even have walked across, passing over the ice in winter. Whether Alaska was, or was not, free from ice during the European Glacial period is uncertain. It seems very likely that the conditions of entrance were even easier than they are to-day. But most of the animals which the Ice Age man hunted did get into America, for not only the mammoth and woolly rhinoceros, but bison, moose, and reindeer invaded the New World.

Since the beginning of the Ice Ages the route via Behring Strait was never more difficult than it is to-day. In fact, man has always been able to enter America by this North-West Passage. Having once entered, these first colonists would probably travel south along the coast of British Columbia. No doubt families and clans would pass up the salmon rivers and into the hills, and gradually diffuse eastward.

It seems likely that the main stream of migration would be to the south along the Pacific coast—that is, by San Francisco to South America, and through Mexico to

Bogota and Peru. When, however, they reached the Pacific coast desert in Peru, they would in all probability swerve off to the left along what was to be afterwards the great Inca Highway, via Tucuman, to Paraguay. They might afterwards travel along the eastern foothills of the Andes to Patagonia, where they may have hunted the mylodon and other unusual game, which is now, perhaps fortunately, extinct.

No settlement in the whole of Central Canada and the United States, as far south as the meeting of the Ohio and Mississippi, would be possible until the ice-sheet, which extended down to this point, had melted away. Nor, indeed, for a very long time afterwards, for the great Lake Agassiz, which covered 110,000 square miles, and other sheets of water, would occupy a very large area. But from California, savage hunting tribes could no doubt pass north-east to the prairies and the eastern forests.

So far as one can judge from descriptions, the zone of civilization in America from California, through Mexico to Peru, is, or was then, a delectable country, which would be favoured even by these earliest of immigrants. In healthy uplands, with abundant game and plenty of edible fruits and seeds, population would increase. Still, there would always be trickles of adventurous wanderers leaving the main stream of movement, and who would occupy the forests of Central and South America. But in South America, if we assume that the pampas belongs to the last half of the European Ice Age—that is, if it corresponds to the loess of mid-Europe—some very intricate little problems require attention. This part of South America, the future Argentina, was then covered by the Pampean Sea. Its western shore would extend to the eastern foothills of the Andes. North and east it would be limited by the uplands of Bolivia and Uruguay. The Sierra Ventana and Tandil, ruins of a very ancient mountain system, may have been its southern boundary.

It seems probable that at this early date, the rainfall on

the western shore—*i.e.*, the eastern foothills of the Andes—would amount to 30 or 40 inches, which is that of Buenos Ayres to-day. In process of time the Pampean Sea began gradually to fill up, owing to the enormous mass of silt and detritus, which, as will be realized from a consideration of these boundaries, was poured into it from the Andes, from Bolivia, Uruguay, and Brazil. Thanks to the activity of reeds and rushes, the whole shore-line of the Pampean Sea would turn into broad marshlands and alluvial flats, with brakes of trees or river-bank woods. The Pampean Sea, in fact, shrank and contracted more and more, until it is only represented to-day by the mouth of the La Plata River. What used to be its bottom is now the "marne diluvienne plastique et assez dure," 40 to even 75 feet in thickness—the pampas of Argentina—a country with a climate almost perfect and a soil almost inexhaustibly fertile, and which (it will be remembered) was given away for no equivalent by the British Government.[1] Did man inhabit the shore-line of the Pampean Sea? But, before this side of the question is examined, we should repeat that so far as the evidence goes, there was an absolutely clear highway for the earliest men from Behring Strait to Patagonia, and open, at any rate, after the first half of the Glacial period—*i.e.*, after the Rissian Ice Age. The journey from the Caucasus to America is an exceedingly long one, so that we could hardly expect even the Neanderthaler to have arrived at Behring Strait until after the Rissian Ice Age.

Now, there is no proof of American pygmies (see p. 191), but there seems to be anatomical evidence of an early race of man in America closely resembling the men of Galley Hill, Engis, and Brünn. In other words, it seems probable that an Aurignacian man, or a cross between him and the Neanderthaler, did enter America. There are, as we have seen, certain Eskimo which appear to belong to the Early Cromagnon type. Then also the "Nebraska loess man" shows sometimes distinct

Neanderthaloid characters. In South America, in the Lagoa Santa caves in Brazil, which contain bones of a large series of animals, both extinct and living, a very interesting set of skulls have been found. These are dolichocephalic, very high and long, with well-developed eyebrow ridges, strong chins, and a slight prognathism. Quite a number of ancient skulls have been found in the Pampas—that is, in the Argentine loess. Some of these are supposed to be of the Lagoa Santa cavern race.[2]

Now, with our ideal Pampean sea, at first covering an enormous area, and later contracting, so that first alluvial flats, and then a sort of loess was formed, there is a curious similarity to what happened during similar ages in Europe. The Lagoa Santa skulls would correspond to the cavern, and the Pampean to the loess races of Europe.

The important point is that we do find in America, along with the predominant chiefly Red Indian and brachycephalic type, a dolichocephalic element, which has also some of the special characters which belong to the Cromagnon × Neanderthal race. Here again De Quatrefages' insight has been justified by recent research.

We are sorry to say that the Calaveras skull, immortalized for ever by Bret Harte, was a recent and not a less recent man, but in certain mounds of the Nebraska loess, and also near Trenton, skulls have been discovered which are not of Indian type. Some of these are decidedly Neanderthaloid, but on the whole they are more brachycephalic than the European type. These are surely remains of an early race, no doubt modified by crossing with later brachycephalic arrivals. Hrdlicka, however, whose exhaustive and careful papers should be consulted, does not agree to this explanation. There is, as we have seen, not the slightest reason why an early race of this character should not have entered America before the end of the Ice Ages. Of very early type also seem to be the skulls discovered in certain kitchen

middens near San Francisco. But all the shellfish and other animals, whose remains were eaten by these people, are of living species. Mr. Nelson estimates that there was a population of 12,000 in this district. He also endeavours to calculate the age of certain refuse heaps (No. 295), by estimating the number of mussels consumed by a family, so as to arrive at the cubic feet of refuse produced in a year.

This calculation brings out an age of 3,500 years. Certainly 1500 B.C. would be a very moderate antiquity for an early race of Neolithic kitchen middeners, using bone implements and obsidian spearheads, but the method of calculation hardly seems reliable.[3] Both the skulls examined by him had marked eyebrow ridges; one was long-headed (73·34) and the other medium (76·5). The main general population of both the Americas is undoubted round-headed, or brachycephalic. The same straight black hair is common all over the New World. The characteristic Mongolian fold of the eye is also by no means unusual.

This Red Indian type (Asiatic according to Sergi) is said to be by no means rare in Mongolia, Siberia, and amongst the Ostiaks.[4] Naturally, having reached America at so early a period that neither domestic animals nor food-plants were known, there has been an enormous variation and modification of the type in a new and in many ways remarkably stimulating continent. We suppose, then, that this very early race of round-headed Mongol formed the main solid mass of American humanity. Though it was crossed here and there by a probably earlier race, which we take to have been a Cromagnon tribe containing a little Neanderthaler blood, and no doubt also older Asiastic strains, the Red Indian, the Patagonian, and, in fact, all American Indians, except those of the great zone of civilization, seem to have been expert tireless trackers and hunters, clever or cunning and cruel in war. But though past-masters in the arts of

destroying wild animals, they were unable to realize the consequences of such destruction. They had not tamed even the coyote, and though they used horses as soon as they could steal them, they seemed unable to understand any other advantages in civilization. Their status in evolution contrasts in the sharpest manner possible with the great civilizations of Mexico, Yucatan, Bolivia, and Peru. There, as we have seen, there were two domestic animals, and a whole series of native American plants had been brought into cultivation. Irrigation involving greats feats of engineering was in full swing; the crops were carefully manured; there were highroads, and regular posts were maintained on them; the population in the great centres was enormous, far greater in Peru than it is to-day. Socialists will find in Peru, just before the Inca system perished for ever, perhaps the most thorough system of State Socialism ever put in actual practice. Each man was supplied with his land, with his wife, with tools, and with plenty of work; the Government was run with great efficiency and at a very small cost to the community.

Many American writers insist that all this was the work of the aborigines, and refuse to admit that there ever was the very slightest help from the Old World. If so, there should be no similarity in these civilizations with those of ancient Asia, either of a general or of a particular kind. It would be also necessary to show that there was no possible road in the past by which the germs of such civilization could be brought, say from China and Japan to the shores of the New World. It is, of course, not necessary to suppose that those who started these great developments were numerous enough to influence the bodily characteristics of the Aztecs and other races. But if these civilizations are wholly aboriginal, the race ought to be in no way different from the ordinary American type. We do not think that any one of these necessary propositions can be made out.

Thus the Kurasiwo Drift and the Bonin currents lead from Japan to California, and in the northern summer to Central America or even to Peru.[5] Chinese junks have been actually stranded on the shores of California.

Moreover, there is a definite legend that a great fleet of boats from the north landed at Lambayeque, near Tumbez, on the Peruvian coast, under a great chief called Naymlap. This story seems only to have been told by Casella Balboa, but none the less, if taken in conjunction with the set of the currents alluded to above, why should we suppose that he invented it out of his own head?[6] It is not very easy to say whether it is the general or particular resemblances in the civilizations of ancient Asia and America that are the most suggestive. There are plenty of both kinds in almost every department, whether of culture, religion, or manufacture. But before considering a few of them, we should, if possible, try to get at the very earliest date of Mexican or Peruvian culture.

In both these States copper seems to have been known. In later times, under the Incas, the metal-work of Peru was exceedingly ingenious. Gold, silver, and bronze were skilfully managed, beaten out or worked up into filigree; there were images of singing birds in gold, and a profusion of gold plate. Yet there does not seem to be any evidence of any similarity in the bronze of the first age in America to that of Asia. We think this shows that the origin of the Mexican and other civilizations corresponded to the age of copper, or, rather, to the latest Neolithic period when copper was known, but hardly in general use. It is true that certain vases in Chiriqui resemble both in shape and appearance an ancient type of Chinese bronze, but this is hardly sufficient to show that our hypothetical immigrants were in the Bronze Age. The Japanese appear to have had bronze swords in the earliest age, or, rather, the first mounds in Japan contain bronze swords of a type which seem to resemble those of

the Fourth Bronze Age of Europe. (They cannot be placed in the same group, but there is a general similarity.) In Europe these swords belong to a period of from 1400 to 1300 B.C. They were probably known in the East very shortly afterwards, at least, as early as 1200 to 1100 B.C.; for at that time China was prosperous and civilized. Iron was, in fact, known in China about 1000 B.C., and in 1100 B.C. there is the famous tale of a chariot which had a figure always pointing due south, and which may (*or may not*) have been an early invention of the compass.[7] Copper is said to have been known in China about 3000 B.C.; gold, silver, and copper were known 2400 to 2200 B.C., and the famous bronze caldrons were made about 2200 B.C. We have only found very rough estimates of date in America. Mr. Nelson's estimate of the kitchen middens of San Francisco Bay would give 1500 B.C.[8] Sir Clements Markham suggests 950 B.C. as the date of the beginning of the Inca period.[9]

On the other hand, the city of Tenochtitlan (Mexico) is said to have been founded in A.D. 1325, and that of the original home (Aztlan Chicomoztoc) is given as only A.D. 1061.[10] Unless these refer to a much later civilization, the last dates are quite incompatible with the others.

But we have seen that our British dolmens go back to 1800 B.C.; those of India have been dated at 1500 B.C., and the first dolmen mounds of China at 1848 B.C. Let us, therefore, suppose that the earliest mounds in Japan were raised at, say, 1200 B.C., and that the Japanese with bronze swords invaded and destroyed this Neolithic civilization somewhere about 1100 to 1000 B.C. Then fugitives from Japan, despairing of any resistance to these Mongol barbarians, set sail, we will suppose, in a fleet of boats, and landed, according to the legend, near Tumbez, in Peru. These people would, on our hypothesis, bring with them a knowledge of agriculture and of domestic animals; they would know how to work copper, and have some sort of misty idea as to the manufacture and use of

bronze and of gold and silver, but they would not be practical workers in bronze. If they brought rice or other grain with them, they must have lost their first harvest, or ate up all their seed-corn during the voyage. They did not apparently bring any animals with them. Such an hypothesis explains the similarities of the civilizations of old Mexico and Peru to those of the Old World, specially of the Neolithic (Mediterranean race) or dolmen building folk—that is, if they had reached Japan. Let us, then, see what similarities can be traced between these civilizations.

First, in a broad general way, there is the fact that the passion for monumental masonry existed in Mexico, Peru, Japan, and Easter Island. A vague statement that all races pass through this peculiar habit during their evolution, very much as dogs pass through distemper or children through measles, has no force unless it is proved by examples. The ancient Peruvians, who worked megalithically, utilized one stone, which weighs 170 tons and measures 36 by 7 by 7 feet; another measures 26 by 16 by 6 feet. On Sacsahuana Hill there is a sacrificial stone, 20 by 14 by 12 feet, with channels presumably intended for leading away the blood of the unfortunate victims.

In Japan there is a block of granite 20 by 12 by 7 feet, weighing about 80 tons, and which forms the cap stone of a funeral chamber, and very large stones are extremely common in the construction of their dolmens. In Peru especially the masons were extraordinarily skilful, and the fitting together of the carefully mortised blocks is referred to by almost every traveller. Then, again, mounds, sometimes of enormous size and carefully terraced, occur in Japan. Pyramids of earth or rubble, probably faced with stone, or it may be with bricks, occur in Mexico. The so-called mound-builders of America seem to have buried their dead with weapons and food under a mound of earth; they then lighted a fire on the top, so that the clay surface is caked or

indurated. We have seen that this custom existed in West Africa, and probably also in China and Japan. There seems a probability that this method of burial was once in use wherever the Mediterranean race existed.

Another general similarity consists in the adoption of a complicated astrology with worship of sun and moon, the observation of sun and stars, of the solstices, and so on. There is not, so far as we can gather, any agreement in the actual systems of months and years. In Mexico the month was nineteen days; in ancient Greece, and perhaps also in the island of Lewis, when Callernish circle was erected, there were twenty days to the month. Although the various centres of civilization in Mexico, Yucatan, Bogota, and Peru differed in many important characters, yet they all agreed in having a complex, very ritualistic State religion. Human sacrifices were especially frequent in Mexico, and probably occurred also in Peru and elsewhere. Of most elaborate nature was the system of the Aztec gods and goddesses. There were gods of the North (of Maize, of the Dead, Tree of the Eagle); of the South (Rain, Heart of the Mountain, etc.); East (Obsidian, Sun); of the West (Water, Earth, the Sunbird); and even a God of the Centre (Lord of Fire and of the Centre of the Earth). Then there were such ideas as the nine heavens one above the other, and of the nine layers in the underworld, and a division of the heaven into houses, with a constellation to each. This obviously means an old, very much elaborated, civilization, ruled by priests and magicians, who managed King-Emperor, nobles, and populace by a system of omens and gross superstition, and in all probability with ruthless cruelty. Their systems of reading omens from the liver or other organs of a slaughtered animal, often of a human victim, resemble those of ancient Greece or Rome and of modern Borneo.

The similarity of all this to the Druidism of England, to certain phases of Egypt and Babylonia, even of Buddhism in India, China, and Japan, is in a general way very

marked. In details there are many definite differences in all these various systems; each represents an independent growth; but in each case the system arises from the existence of a humble, timid, thoroughly downtrodden, yet intelligent population, living by agriculture, who were exploited by a priestly caste for their own purposes. In most cases the ruling class had strains of a different and more virile type of mankind.

That such an able, mathematically ingenious and intensely superstitious system should have been invented out of their own heads by the ordinary Red Indians is surely very improbable. But besides this general similarity, one finds now and then the same custom, or weapon, or belief, both in America and the Old World. A few of these may be mentioned here, but of course the reader will understand that we have no space for a thorough examination of this interesting question. Both the sacred "svastika" which was probably a poetical and superstitious symbol of the sacred fire, and also the concentric circle—that is, a dot surrounded by one or many rings—are found both in the New and the Old Worlds.

The following ceremony seems to have been regularly carried out every year both in China and in Peru: On a certain day of the year, the Emperor, a more or less Divine Son of the Sun, turned up the first furrow of the year's harvest with a golden plough.

Then again the priests, both of Baal, of Cybele and in Mexico, used obsidian blades to make incisions in the tongue or in the muscles of the arm or ear as a symbol of human offerings or for divination.[11] It is not certain if the pygmy flints of Neolithic Europe were inserted in wooden clubs so as to make a very formidable weapon. But this seems probable. They were certainly used in this way in Polynesia, and also in the American zone of civilization. We have already pointed out how irrigation, terraces, and the use of manure in agriculture are found both in the Old and New Worlds.

From the "lynchets" of England, by Spain, Tripoli, Egypt, Mespotamia, India, Burmah, China, Japan, Mexico, and Peru, there is a nearly continuous chain of this particular system of agriculture. This method of growing crops hardly exists anywhere else except along this particular route, and in such islands as Madagascar, Java, Sumatra, etc., which are in direct continuity with it. Another odd little common trait is the use of a peculiar system of beads on strings for calculation, which is, so far as the writer is aware, only known from ancient China, Peru, and Mexico.[12] Myths, legends, and folklore are of all methods of hunting up the past of a people at once the most difficult to read, and perhaps the least reliable in result. Still one ought to give here the latest conclusions on the subject. Amongst the Koriaks who live in the north-east of Siberia, Waldemar-Jochelson[13] made out about 122 characteristic episodes in their ordinary myths and legends. Of these some 83 per cent. occur in North America in the Red Indian stories, 29 per cent. are found amongst the Eskimo, and 18 per cent. seem to be traditional Mongol tales widely distributed in the Old World.

This, of course, would not show more than that the Red Indian came originally from North-East Asia, which, as we have already suggested, seems almost certain.

North-Western America and North-Eastern Asia seem, therefore, to form but one province mythologically. But it has also been shown (by Ehrenreich) that many of these myths and legends occur in South America as well as in the Red Indian centres. The same author traces certain legends from Japan to South America and along the Pacific Coast.[14]

Let us now try to reconstruct the story of the peopling of America. The earliest arrivals may have been dolichocephalic, or long-headed, descendants of the Asiatic and European Ice Age men allied to the people of Cromagnon but with some Neanderthaler and Asiatic blood in them.

They selected the best hunting-grounds, and probably first occupied the culture zone from Mexico to Peru. It is their stragglers, more or less crossed with the round-headed Red Indian, that were found in the Lagoa Santa caves and perhaps in the Nebraska loess. The next invasion consisted of the ancestors of the Red Indian, and of the ordinary South American Indian. These were round-headed, or brachycephalous, with straight black hair and broad faces. They were mere hunting savages, but better hunters and better armed than the first colonists, and migrated in clans or small tribes. These later arrivals practically colonized all the two Americas, but never seem to have risen out of the hunting stage. About 1000 B.C., a small fleet of boats containing fugitives arrived on the shore of South America, perhaps near Tumbez. These people were almost the sole survivors of the original dolmen builders of Japan. In that country they had settled on the best lands, dispossessing the original Ainu and cultivating the ground by their usual methods of irrigation—that is, by intensive and *petite* culture. They were in the Copper period, with an advanced astrology, and worshipped the sun, moon and stars.

They were unwarlike and peaceful, whereas the first Japanese may have been not very unlike the average Mongol or Turk invader, who destroyed all the great civilizations of Mesopotamia. But those fugitives who reached Peru gradually established an easy sort of control over the mere savages whom they met with. They increased greatly in numbers as soon as they had succeeded in cultivating maize and the other American culture plants. If so, they would in course of time bud off colonies, who would possibly establish themselves in Mexico, Colombia, and elsewhere. Perhaps the mound builders were a very early colony trying to occupy part of the United States. But as soon as rich and wealthy cities began to grow, sudden invasion from the more vigorous aboriginal tribes might overthrow and destroy the original

type. The conquerors, after the usual development through freedom to glory, and so to wealth, vice, and corruption, may have again fallen before another irruption of virile barbarians. The weak point in our hypothesis is the absence of any very definite proof of the supposed Neolithic people. Sergi certainly states that there are Polynesian elements in America as well as Asiatic (Red Indian) and autochthonous (the supposed Cromagnon × Neanderthaler). But it is difficult to make out the race elements in the Aymara or Quechua Indians, who now live in Bolivia and Peru.

They are a mild, good, and feeble-spirited folk, of a sad, pensive, and melancholy disposition. They often have a Roman nose, with retreating forehead and chin; a large slack mouth; and eyes small, dark, and slightly inclined. They are hard workers, but do not seem to be increasing in numbers. Of such a race it would be so easy to say too much that we shall say nothing more, but advise the reader to examine the numerous photographs in Chervin's great work,[15] and also to consult the clear and masterly sketch given by Forbes.[16]

The special peculiarities of these Aymara and Quechua seem to be the Roman nose and an unusual development of the chest, which may be a consequence of the rarefied air of the plateaux. Although this explanation has been contradicted, no other has been produced, and the only reason assigned for its rejection seemed to be simply that the objector had a difficulty in believing in the inheritance or any acquired character. Roman noses occur in the ordinary Red Indians. It must be admitted that, as regards the physical characteristics of the Mexican and Peruvian, there is but little confirmation of our hypothesis. Still Sergi admits a Polynesian element in South America, and in his view the Polynesian is a cross between the Asian branch of the Mediterranean with other races, chiefly Mongolian. If so, these colonists of 1000 B.C. would supply this factor in the South American people.

But in all other respects our hypothesis seems to explain both the general and particular resemblances which we have mentioned above.

Before 1000 B.C. the ancestors of these people then may have been the humble, hardworking Neolithic cultivators of early Japan. In America they were undoubtedly conquered once by the original Incas, who may have been a strong and savage tribe, not unlike the Araucanian of history. Then they were subject to the State Socialism, just as despotic, of the Incas; after this to the Spanish conquistador; and since the republics of Peru and Bolivia to a long series of wars and revolutions. Their character is exactly what one would expect from a race with this history. One can unfortunately find many parallels in the story of mankind.

The Chinese coolie, the Hindu ryot, the Egyptian fellahin, have had very similar experiences, but all these three are already beginning to show signs of a strong and virile recovery. We hardly think that the Aymara will remain for ever without spirit and without enterprise. In fact, such qualities as they possess represent treasure inestimable to any nation, and no doubt they will have their chance of influencing the world. Even as it is, the race which first grew maize, potatoes, tomatoes, not to speak of tobacco, should be undoubtedly held in honour and respect.

Note.

That man entered America during the later Ice Ages seems even more probable from further evidence, especially Volk's discoveries at Trenton (*L'Anthropologie*, 1911) and Bingham's at Cuzco (Lull, *Yale Review*, 1912). We should also mention Samwel Cave, California (see Putnam, Merriam, and Furlong, *L'Anthropologie*, 1907).

Holmes (*ibid.*, 1911) agrees that the Eskimo invaded Asia originally. Chamberlain supposes that they are of American origin (*ibid.*, 1912).

We are not convinced as to American pygmies, though this view is upheld by Macritchie (*Globus*, 82, 1902) and Haliburton (Proc. Am. Ass. Adv. Sci., 1894).

[1] Scott Elliot, *Geog. Jour.*, May, 1906; also *Chile*, 1907.

[2] In this we follow Mochi, who places Arrecifes' skulls with the Lagoa Santa. Besides Arrecifes, the following are supposed by Lehman Nitsche to be also of Quaternary Age, which we may perhaps place in the Riss-Wurmian—namely, Arrecifes, Frias, Saladero, Samboromba, Fontezuelas, Chocori, Miramar, and Necochea (see Hrdlicka, Bur. Am. Ethn., 33, 1907, and 52, 1912).

[3] Nelson Univ. Cal. Publ. Amer. Arch. and Ethn., December, 1909, and April, 1910.

[4] We understand that this was stated to be the case at the Geneva Congress.

[5] Hambruch, *Arch. f. Anthrop.*, 1908-09.

[6] Joyce, *South Am. Anthrop.*, 1911; see *Man*, 44, 1912.

[7] Gowland, *Archæologia*, vol. lv., pt. 2.

[8] Nelson, *loc. cit.*

[9] Markham, *Incas of Peru*, 1910.

[10] Lehmann, *Arch. f. Anthrop.*, 1907.

[11] Seyffert, *Arch. f. Anthrop.*, 1911.

[12] Seler, *L'Anthropologie*, 1905.

[13] Waldemar-Jochelson, *L'Anthropologie*, 1905.

[14] *Zeit. f. Ethn.*, 1905, Suppl. Band; also *L'Anthropologie*, 1906.

[15] Chervin, *Anthropologie Bolivienne*, 1906.

[16] Forbes, *Jour. Ethn. Soc., London*, 1869-70.

CHAPTER XVIII

PREHISTORIC ART

It is impossible to give any reason for the love of art, or, rather, of making pictures. The linnet sings "because it must," and boys or girls, from the age of four or five years upwards, will draw horses or people with intense pleasure to themselves. At these tender years the love of art is pure, without any of the faintest touch of that boiling-pot which afterwards blackens so many fair ideals. The infantile mind takes pleasure in creating things that for the moment appear to itself beautiful. By no means sure whether the drawing that began as a cow may not, through unforeseen slips of the pen, after all turn into a pig or horse, there is a pure, heart-felt delight if something faintly resembling the original animal is produced. The environment to a child artist means nothing; praise or criticism has but very slight effect. It is the pleasure of creating something, alleged to be beautiful, that is the real charm.

As soon as the child is intelligent enough to understand criticism, the ideal artist is lost. He endeavours to follow suggestions, accepts and works for praise. It is, in its own small way, turning out a pot-boiler. Fear of ridicule, self-consciousness, but probably in most cases the active enjoyment of much more exciting games, soon destroys the early artist; only a minute proportion of those who once loved art remain devoted to it.

The most thorough account of this curious point is given by Dr. Kerschensteiner,[1] who collected 500,000 drawings made by the Munich children, and which he worked through carefully. He found that 50 per cent. of

the children were very keen to draw, but after a certain age (about ten years old) they lost interest, and millions of them never drew again. He finds some interesting differences between the sexes. Boys seem to have an idea of perspective at the age of seven, girls not until nine years of age. The girls are, however, better at "rhythmic decorative" and "surface ornament." By the kindness of Mr. Hiscock I was allowed to give a subject for the boys and girls in the three higher classes at Laurieston school. They were simply told to draw a horse or a cow, and received no hints or any kind of help. None of them

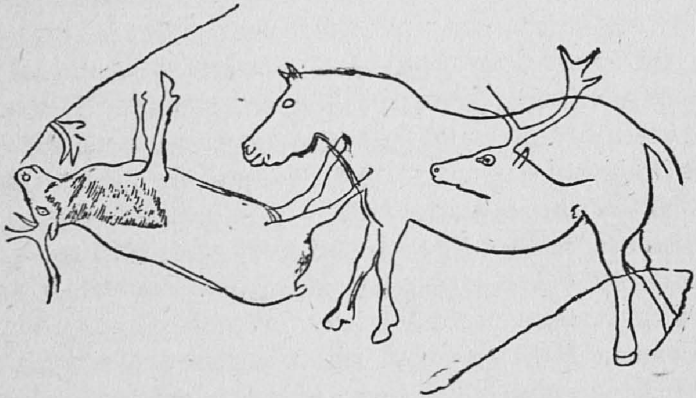


FIG. 24.—HORSE AND REINDEER DRAWN BY MAGDALENIAN ARTISTS AT THE GROTTE DE LA MAIRIE, DORDOGNE.
(By permission of M. l'Abbé H. Breuil.)

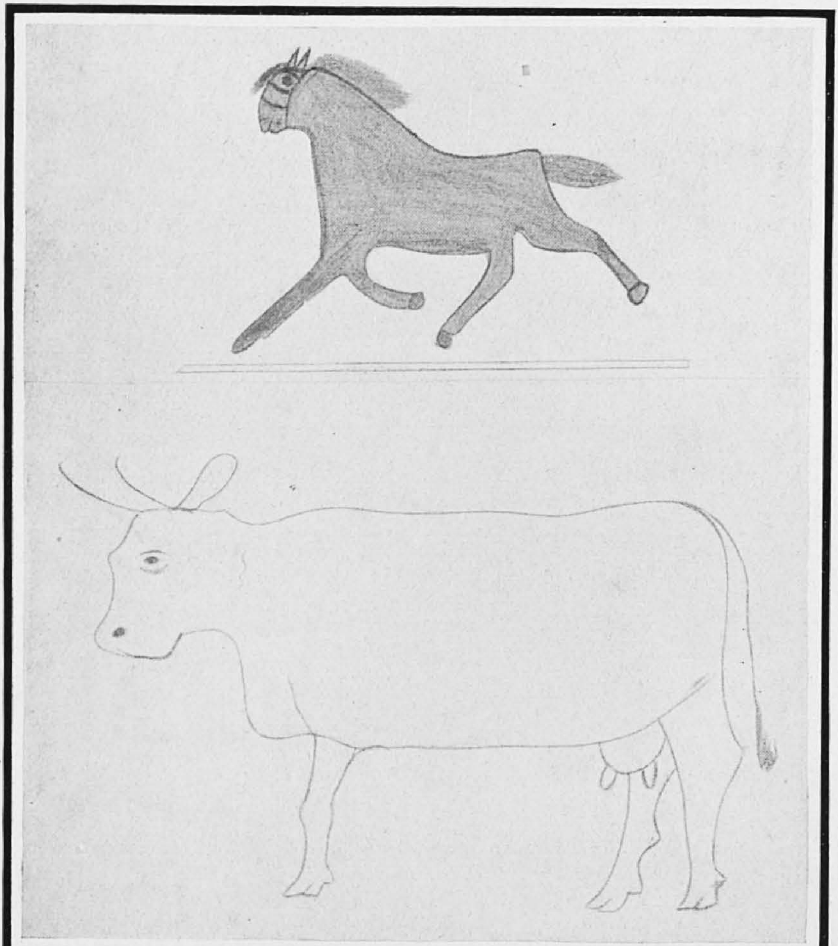
had ever received any instruction in drawing. The two best drawings are given on the accompanying plate. The others were not so spirited, although many were done by boys and girls of twelve years old—that is, two years older than the two selected.

Whether the comparison of the drawings of prehistoric man to those of modern children is altogether just and fair is, of course, doubtful. But there certainly are distinct similarities in the result. In almost all cases beasts are chosen for illustration. The animal is almost always in full side view, and completely and utterly flat. One or

more legs are often forgotten, owing, perhaps, to a sudden loss of interest. Great care is often shown in the careful delineation and shading of minor details, such as the hoof or the forelock and ears of the horse. The animal is, with the rarest exceptions, shown wholly in the air, without any background, and standing or galloping on nothing. In a very few prehistoric French drawings a sort of composition or scene seems to be sketched out. There is one representing a herd of horses, who have stopped suddenly because the leader has seen something suspicious and is alarmed. A sort of sketchy attempt seems to have been made in this piece to represent marshy ground with patches of reeds.

We do not think that any race of man, savage or civilized, is without artistic sense. The habit of drawing little figures of animals, and often of men, is quite extraordinarily widely spread. All the pygmy races seem to enjoy this amusement. The Australians make very elaborate drawings; Eskimo, Red Indian, South American Indian, Lapps, ancient Scandinavians, Kabyles of Algeria, Europeans of the Midi in the Bronze Age, made, or still perpetrate, sketches of a peculiar type. These are not nearly so good as those of the Bushmen or of the French Palæolithic people. Often they are more or less conventionalized, but it is very difficult to believe that any of them are in any way connected with magic or superstition; they are too like the meaningless scribbling of boys and girls. On the other hand, those of Egypt (after the very earliest times), of Mexico, of Crete, and of the present Australians, seem to be certainly mixed up with ceremonial or magic.

It is in France that one can find, not only the earliest, but a whole series of works of art, culminating in the polychrome frescoes of some of the Magdalenian caverns. We think that in these last mentioned there is the first definite proof of magic. After the Azilian, with its mysterious painted pebbles, we find, in apparently the French



MODERN DRAWINGS BY BOYS

To compare with the French palæolithic work

These were drawn in Laurieston School, Galloway, by boys (McNeil and Proudlock) of ten years of age. The horse is not without the spirit of movement. Note also the careful finishing of the hoofs, and the absence of one leg in the cow. In these points, as well as in the utter flatness of the drawings, there is a distinct resemblance to palæolithic sketches

Bronze Age, a whole series of rock drawings of quite a different character. It is in France also that we find what is claimed to be the very first effort at sculpture known to be made by mankind. These are the "figure-stones," of which no less than seventy have been collected by M. T. Dharvent. Boucher des Perthes, even in 1847, believed that certain *pierre figures* had been made by man, and M. Dharvent's researches merely carry on the suggestion made by the illustrious founder of anthropology.

M. Dharvent gathered all the specimens himself, and under the following circumstances, as described by M. Vaillant: "Il n'eut longtemps d'autre compagnon dans ses courses qu'un enfant dont la collaboration matérielle lui était indispensable le jour ou, victime de sou dévouement, il avait perdu ses deux mains."[2]

So there can be no question of forgery or bad faith. We give two illustrations of M. Dharvent's figures. It will be seen that they are just natural flint nodules of an odd and peculiar shape, and which have been made still more life like and peculiar by a few (on M. Dharvent's explanation) slight artificial touches of the prehistoric sculptor. Now, there is no doubt that prehistoric man did notice, and sometimes carry home, odd stones, and even fossils, for such have been found in the caverns. Moreover, it is quite common in the French caves to find that the Palæolithic artist had noticed the resemblance of the outline of a rock to the back of a horse, or a projecting knob to the hip-bone of a cow, and had arranged his engraving accordingly. Sometimes he left the line of rock as part of his drawing. The flint nodules are certainly oddly shaped, and if he happened to notice some queer resemblance to a duck or a goat, it is by no means unlikely that he would improve it by a few deft and nicely placed chips. This would make it even more funny and grotesque than the original. We think, however, that there were not any monkeys in France at this period, and both our two figures may have seemed to him comically

like men. It is remarkable that in Egypt (Abydos) natural flints resembling an ape (a sacred animal) had been deposited in the temple, and had been brought from a long distance. So, also, in a chapel at Knossos in Crete, two natural stones, one like an ape and the other like a woman carrying a child, were actually worshipped. According to Pausanias, the sacred grotto of Pan in Greece contained rocks which looked like goats.[3]

We think this shows that the Palæolithic eye could, and did see, such resemblances; so it seems to us not only possible, but probable, that these *pierre figures* really were the first attempt at statuary in France. At the same time, we have to confess that some of the seventy specimens did not seem to us convincing.[4]

In the Aurignacian stage the beginnings of sculpture and engraving are quite unmistakable. It is a curious point (one of some theoretical importance) that scratches and scribbles on bone seem to have been made probably at quite as early a period as pictures of animals. Many of these scratches are exactly like the marks still made in Scotland by otter hunters on the long stick which is carried (theoretically) to support him when wading across deep water. It is a natural hunter's instinct to do this, and requires no explanation. Although these marks and meaningless signs and scribbles do occur at a very early date, yet sculptured heads, and even engraved outlines of animals, are also found in the younger Aurignacian. The few illustrations for which we have place hardly give an adequate idea of the extraordinary vigour of artistic life in France and the Pyrenees during the Aurignacian and Magdalenian periods. M. Cartailhac, at the last Prehistoric Congress, gave an evening lecture devoted to the work of these early artists. The hall was the largest in Geneva; it was crowded to its uttermost capacity with an audience that contained some of the most celebrated anthropologists in the world, as well as other notables of all nationalities.

Thrown on the large screen were the sketches of those Reindeer and Urus, of Bison and Horses, amongst which the Palæolithic artist had lived. Even under these trying conditions—not, that is, as they were originally shown—perhaps in a dimly lit cave, and to innocent, easily impressed, and quite uncritical savages, the full vigour and beauty of these spirited sketches left nothing to be desired. One could hardly think that the savage artist ever dreamed of seeing so many people alive, still less that they would all be admiring his own work. Certainly no artist alive to-day will ever enjoy such appreciation. As French art criticism is adequate and nicer to read than that of any other nationality, we will quote here two of the best authorities on these artistic masterpieces. M. Breuil, in describing the galloping reindeer of St. Marcel, Indre, points out that animals in motion are represented in somewhat the same way at Mycenæ; but that neither there, nor in Assyria, nor in Egypt, not even in Europe until the eighteenth century, does there exist any drawing of moving horses or other animals so spirited and full of life as those of Magdalenian France. "N'est ce pas . . . la création d'un génie puissant, libre, hardi, profondément original et varié dans ses manifestations?"[5] From M. Piette we learn that the artist "eut le souci de la forme vraie, des proportions, de l'allure," and especially that he never introduced extraneous ornaments invented by himself.[6]

The truth to life of these illustrations is proved by the ease with which different species are recognized. It is obvious that the wild horse of Prjevalski, and also the forest horse, existed in the south of France. Every detail in the tail, mane, and feet of the first species are given correctly and unmistakably. In some twentieth-century books authors are still rash enough to introduce their own sketches, but we find it very difficult to say that the modern hunter's drawings are as spirited or as true to life as those of the Magdalenian. It is

interesting to note that what seems to correspond to a Palæolithic copybook has been found, containing numerous sketches apparently made for practice. Moreover, here and there some of them seem to have condescended to do a mere *tour de force*, as in a certain ox's head, which remains this, whether it is viewed upside down or not. There is also the drawing of a swan, which has three necks and one body, the line of the back being similar to that of the under-surface.

We also think that we have detected a case of "cubism," for in one small sketch all the lines are straight, but still a horse's head is distinct enough. M. Piette considers that some of these drawings are even signed by the artist's own mark. He also believes that they had some feeling for foreshortening, but in this we can hardly follow him. A large proportion of the best drawings and paintings are found in dimly lit or dark caverns, and it is not at all easy to understand the conditions under which the prehistoric artist had to work. He must surely have used a lamp of some sort, perhaps like that of the Eskimo.

If M. Dharvent is correct in supposing that the first figures are embryonic sculptures, then it is natural enough that the first attempt to make a likeness of an animal should be a rough blocking out of an animal's head, such as occur on *bâtons de commandement*, etc. The next stage, that of bas-reliefs, would be almost forced upon them when they tried to fashion a statue out of such a substance as reindeer-horn, which is too thin or flat for anything except bas-relief. Finding this sort of bas-relief effective enough, they next tried something between an engraving and a bas-relief, the so-called *gravures à contours découpés* of M. Piette, in which the more effective lines are deeply chiselled out in the ivory. Horse heads, a favourite subject, lend themselves beautifully to such work, the lines of the ears, cheek, nostril, underlip, and neck being especially carved out with conscientious enjoyment.

"*Out of the love that he bore them, scribing them clearly on bone.*"

From this there is an easy transition to engraving with shading by fine lines, and even points. In Cantabria (Spain) the development of art followed on slightly different lines. The first period includes figures made with the fingers on the clay of the cavern floor, and which are at first almost unintelligible. The paintings of red deer, chiefly hinds (Castillo), and certain curious signs like ladders, form the second period, and also small drawings done in black. A third series in which the horse is the favourite subject (Altamira, Castillo, and

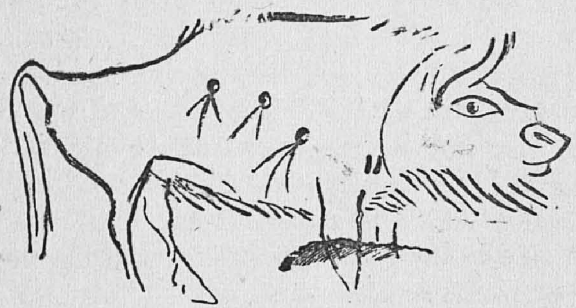


FIG. 25.—A WOUNDED BISON.

The prehistoric artist drew this sketch on the dry, loamy soil of the cavern at Niaux. He utilized three natural holes, due to drops of water, as arrowheads. One-eighth natural size.

(By M. l'Abbé H. Breuil, *L'Anthropologie*, tome xix.)

Pindal) are either drawn or engraved, or painted in red. The last and finest of all the artistic efforts of this period is represented by the fine polychrome frescoes of Altamira, in which the bison is the most usual animal.[7]

The colours used—red, yellow, and black—seem to have been obtained from red or yellow ochre, with grease or lamp black. Their lamps would no doubt furnish greasy soot, and red ochre seems to have been used for painting the body, or at any rate the face of the dead. The outline seems to have been first painted in with black, and then the other colours or engraving carried out. These

polychrome frescoes, often described, are perhaps the finest examples of the Magdalenian golden age. A very curious and apparently unique example was found by Le Comte Begouen in the cave of Tuc d'Audoubert (Ariège). This consisted of complete statues of a male and female bison modelled in clay. Horns, ears, and eyes are carefuly modelled, and the curling hair shown by deep lines. They are shown lying down against a rock. They are about two feet in length.

The artists not infrequently deliberately drew over the work of some previous engraver. Indeed, this is done so often that one wonders if they did not feel it their duty to distract the eyes of their own contemporaries from the inferior work done by their predecessors. It is impossible to calculate the number of paintings and engravings left by the artists of this, the golden age of French prehistoric art. There must be by this time two or three thousand pictures catalogued. The animals which they preferred to do were probably those that they knew best. By far the commonest are Horse, Reindeer, and Bison. The Wild Ox or Urus (*Bos primigenius*), Red Deer, Ibex, are not nearly so common. Drawings exist of the Bear, and Serpent, as well as of the Mammoth and Woolly Rhinoceros. But we do not think there is a single engraving of any of the cat tribe, nor of the Hyena.

One gets the impression from these drawings that they are the result of close study of the living animal. Now and then one finds perhaps a sketch of a horse's head which seems as if it had been drawn from a dead carcass. But as a rule the drawings are from life, and it is obvious that the prehistoric artist, however enthusiastic, would hardly risk the study at close quarters of such lively animals as the cave lion, hyena, and wolf. He had, however, studied the bear, for this is quite obviously true to life. Perhaps we should mention here one of the most remarkable discoveries. At Niaux, most of the paintings were on the rock wall of the cave, which

has been almost polished smooth by fine sand, carried by the water which originally excavated the cavern. Then, after a long interval, a thin transparent stalagmite covered over the figures and preserved them. In some cases the black of the actual figure has been washed off by water trickling down the sides of the caves, but the drawing can still be made out by the reflection of the light on the smooth lines where it once existed.

This cavern is extraordinarily still and silent, with an extremely equable temperature. Placing their lantern on the ground, M. Cartailhac and Breuil were astonished to find that there was a drawing of a horse outlined on the actual sand of the floor! By the most fortunate accident, there are places in the cave where the foot of the tourist has not trod, and in several of these sheltered spots, drawings were discovered. Not only so, but the footprints of the artist himself, or of his friends, have been detected![8] Their feet were small with the big toe larger, and they had no sandal or moccasin. These particular drawings in the cavern of Niaux are said by M. l'Abbé Breuil to be equal to the best that was ever produced by prehistoric Magdalenians. As mentioned above, we cannot see the smallest reason for supposing that they were anything but a pastime and an enjoyment for clever savages who were also "fond of admiration." Children take precisely the same pleasure in the creation of snowmen, or drawings, and have no superstitious feeling about their work. But in this cave of Niaux, there is the first sign of an imminent corruption and decay. A touch of worldliness has crept in. It is not now art for art's sake only.

Hitherto it had been almost the ideal of Mr. Kipling:

"No one shall work for money, and no one shall work for fame,
But each for the joy of the working and each in his separate star
Shall draw the Thing as he sees It for the God of Things as they are."

We regret that it is our duty to show that this fair ideal was shattered.

On quite a large number of the drawings one finds clearly marked an arrow or arrowheads. In one case an exquisite drawing shows a bison which has just collapsed and fallen in a heap with a broad triangular wound just behind the shoulder. Most of the arrowheads are, in fact, placed in a vulnerable spot, over the heart, in the neck, behind the shoulder, or near the kidneys.

When a savage race has arrived at such a level of general well-being that several families live together, it is almost invariably the case that one individual be-

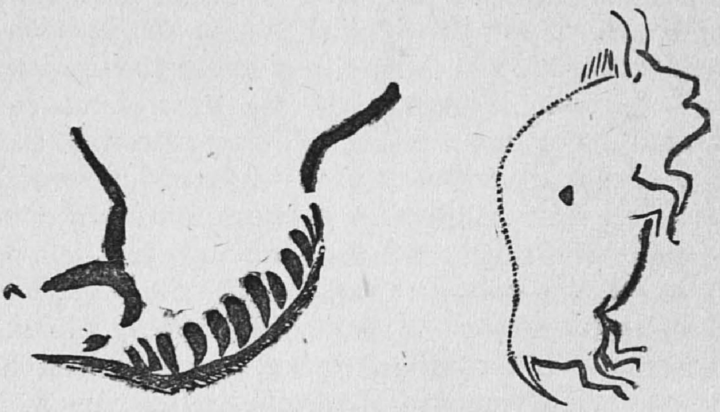


FIG. 26.—DRAWING IN CAVERN OF NIAUX (ARIÈGE).

The right half represents a wounded bison collapsing. The arrow is shown behind the shoulder. The dotted line is the edge of natural rock used to complete the sketch.

(By M. l'Abbé H. Breuil, *L'Anthropologie*, tome xix.)

comes a professional wise man, who may be called shaman, wizard, or witchfinder. One of the earliest superstitions which is found apparently in every race is a curious confusion of the shadow of a man with the man himself; it seems to spring from a vague and indefinite belief in personality. The hairs, nail-parings, as well as the shadow, are subject to the attacks of ghosts, and of the professional ghost-master if he wants to get control over the man. So, in a vague way, these pictures of the animal hunted were supposed to have

some strange effect on the animal itself. Therefore arrow-heads were placed where the artist hoped that they would strike. After this, there could be no mere artistic enjoyment in drawing animals. It became a matter of business, of filling the pot.

During the next stage of French industry, which is represented in the cave of Azil, there were apparently neither horses nor reindeer, but red deer only. In this next stage the whole artistic development of the Magdalenian suddenly dies away. We find, however, certain pebbles marked with coloured bands or dots, which resemble very closely the similar marks of the Australian churingas. As these Australians are in the full development of a complex system of magic, with old men as wizards and rulers, it seems very probable that the people of Mas d'Azil were also dominated by magicians. There is a clear connection between the Magdalenian in the south of France and the Azilian which followed it. But as we have shown (see p. 176), the most vigorous and energetic of the Magdalenian probably followed the reindeer and bison out of France. No doubt the more energetic young men in Australia would also depart if they could. We have said nothing in this chapter of other signs and marks, of which there are hundreds in these French caverns, for we considered that the artistic development was worthy of a chapter to itself. These marks and signs seem to us to fall into two groups.

One series may represent numbers and letter signs. The others are probably more or less conventionalized, or magical marks intended to impress the vulgar crowd with the vast learning of the magician.

In the Ghizeh Museum at Cairo, there is, or used to be, a most life-like painting of geese, which resembles in style those of the French Magdalenian period. Similar bird figures of great spirit and true to life are said to have been found at Susa. In Crete, the sea-life of the Mediterranean—the octopus, triton, etc.—begin in the first to

second Minoan period, but seem even then conventional and not original life-pictures. They may have developed from a much earlier artistic time. The Bushmen drawings in South Africa are the nearest in spirit and character to those of the French Magdalenian. Those of Japan and China, though infinitely advanced beyond these primitive attempts, retain the same general character and unusual truth to nature.

Perhaps something should be said of the few drawings of the human figure discovered in the French caves. These are exceedingly crude and often the merest caricatures. One drawing of a man has an extraordinary resemblance to one of the Dharvent *pierre figures*, and has been compared to a monkey's head.

It has been suggested that these drawings are also of a magical or semi-magical nature. But M. Luquet, after a careful comparison of all the examples, shows that they are very like the gross caricatures done by children, and his suggestion is that they were the first efforts at comic drawing, and done without any superstitious intent, and in pure or rather somewhat coarse light-heartedness.[9]

[1] Kerschensteiner, *Die Entwickelung der Zeichnerischen Begabung*, München, 1905, with 800 figures and 47 coloured plates; see Ranke's review, *Arch. f. Anthrop.*, 1906.

[2] M. Vaillant, Compte Rendu Congrès Préhist., Fourteenth Session, Geneva, 1913.

[3] Deonna, Comptes Rendus Congrès Préhist., Geneva, 1913. Though we have quoted these instances from M. Deonna, he does not admit the theory of M. Dharvent.

[4] M. Dharvent's paper is in the same volume, p. 515.

[5] Breuil, *L'Anthropologie*, 1902. (Are these not creatures of a genius at once strong, independent, courageous, and profoundly original, as well as varied in its manifestations?)

[6] Piette (*L'Anthropologie*, 1904) had the instinct and desire for the true line, for proportion and gait.

[7] Alcalde del Rio, Breuil, and Sierra, *Les Cavernes de la Région Cantabrique*, 1912; see *L'Anthropologie*, 1912.

[8] See Cartailhac and Breuil, *L'Anthropologie*, 1908. No illustration is given of these footprints in the sands of a very long time ago. The authors point out that no one goes barefoot in this district where a very ancient type of shoe is used universally. Also Begouen, *L'Anthropologie*, 1912, p. 660

[9] *L'Anthropologie*, 1910.

CHAPTER XIX

THE DEVELOPMENTS OF ART

The most interesting chapters in the story of mankind are those by which one traces back some great acquisition of our own times to its very first source; so in the grandest of opera, where every variety of stringed instrument and of resonance is required to hold the most difficult audience in rapt attention, one seldom spares a thought for the little idle ancestor of the Bushman who sat on a rock in Africa and twanged his hunting-bow for his own private amusement. The developments which sprang from the mere pleasure of drawing a wild beast were of the most complicated character. We have tried to show how, in the first beginnings, there is no real reason to suppose any occult meaning for the first pictures or engravings. Not only children of ten, but artists still enjoy the process of drawing and painting.

But the developments of this simple, innocent amusement were unexpected.

There were, in fact, so many of these, that it is nearly hopeless to try to classify them in any sort of satisfactory way, but we must try to do so.

1. The origin of the alphabet, of numbers, of weights and measures.

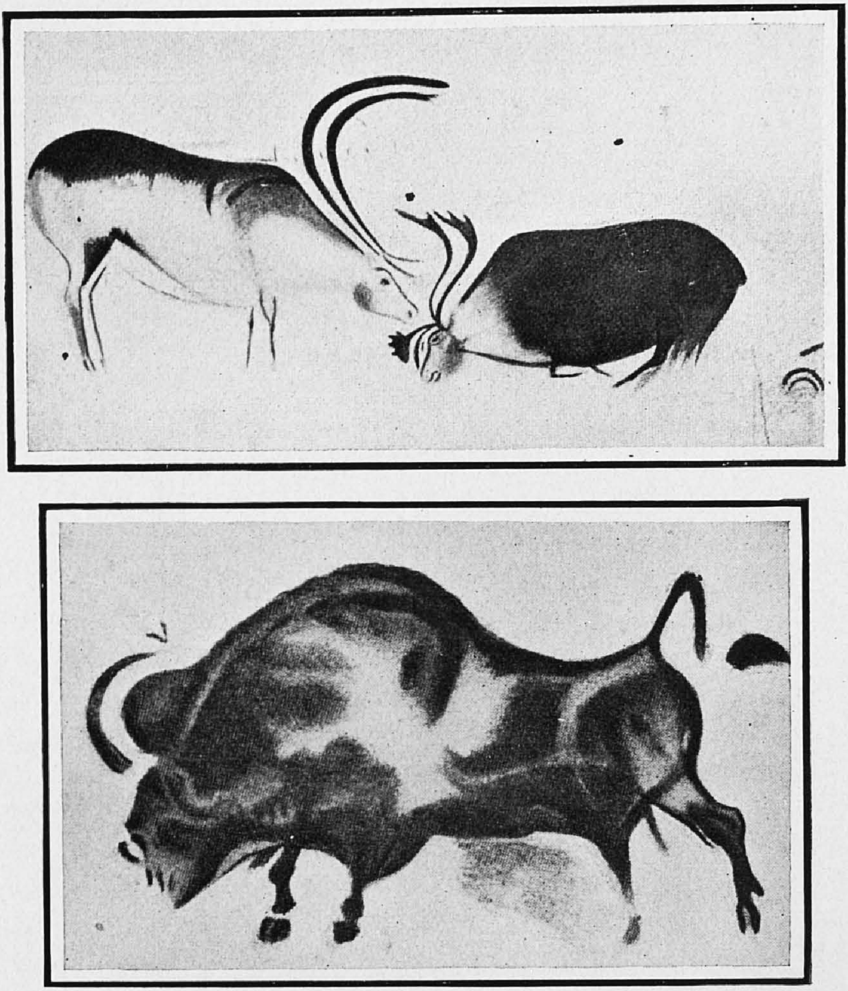
2. Long before the very idea of a letter of the alphabet or a figure had upset and educated the savage brain, there were picture messages, which would be easily understood and easily made by consummate draughtsmen, such as were the prehistoric cave-men of France.

3. Conventional art, intended merely to please the eye and record great events.

4. The use of magical signs of a permanent and mysterious nature led also to a great development, much mixed up in the preceding, but essentially different.

Moreover, though all these great evolutions were going on, sometimes together, sometimes in quite independent fashion, the human nature of man remained very much the same. Boys still made the rudest of drawings, and even grown men, with nothing better to do for the moment, amused themselves by scratching on rocks pictures which were usually vulgar and silly, as well as artistically beneath contempt, or sometimes quite meaningless scrabbles, to explain which is a misuse of time and ink. We shall try to give some account of the alphabet elsewhere, but we wish here to mention some of the more interesting developments in the other lines. In the common round of daily life in Aurignacian times, simple messages would be far more than convenient; almost a daily necessity. The first perhaps would be, "Trespassers will be prosecuted." We think the cave-men would like to leave for his wife such messages as, "A bear is in the fourth valley with the broken tree"; "I killed a horse by the great rock—want it for dinner to-night"; "Shall be away three days following a wounded bison"; "War parties from Les Eyzac went west last night," and so on.

Unfortunately, when one examines the drawings—say, those in the Cave of Altamira and elsewhere—although one often has a feeling that they are really intended to convey some sort of message, it is quite impossible to divine its meaning. There is one sign which seems to represent a summer shelter or brushwood hut. There are in other caves clear pictures of throwing sticks and of arrows. One particular shape has, as has been pointed out by others, a distinct resemblance to a hand-sledge, or perhaps to snow-shoes. But we have no reason to suppose that the Magdalenians possessed sledges or snow-shoes, although the Eskimo use the former, and would certainly



PREHISTORIC DRAWINGS

These drawings of bison and reindeer show that in the French palæolithic period real artistic talent existed

By permission of Professor Breuil, Paris

never have invented it in a climate so entirely without timber.

It is with the Eskimo that one finds a regular system of picture writing, as in the story revealed in the figures below. Every detail of the hunt can be made out. There is a conventionalism about the figures of the men, but still it is a series of pictures, not a language. Amongst the Sea Tschuktchi, who live in North-East Siberia, there are expert carvers in mammoth ivory and in reindeer horn. They place the bone in hot water to soften it before use, which may possibly have been also done by

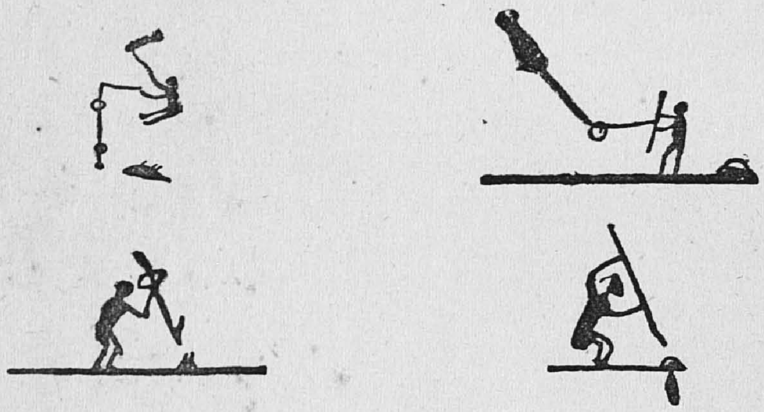


FIG. 27.—AN ESKIMO DRAWING EXPLAINING A FISHING EXPEDITION. (Author, *Romance of Savage Life.*)

the prehistoric artist.[1] The Red Indians also have, or had, a rather elaborate system of picture-writing, which will be found explained in detail by Frobenius and others. An interesting point is that their pictures are signed.[2] (See p. 299.)

The chief signs the picture (in the lower right-hand corner) "Running Antelope," which was his name. The Red Indians had also a series of conventional signs, which stood for such ideas as sunrise, noon, sunset, calumet of peace, but would not be so understood by a stranger. Some of the prehistoric French signs may be symbolic—that is, a picture brought to its simplest elements. One

would think that having got so far, they would have gone on to the invention of a written language, but they do not seem to have done so. The idea of a symbol for each sound in a word is probably far beyond the compass of any ordinary hunting savage.

In Sweden and Norway there are some very remarkable rock drawings. They are rude and conventional. The most usual subjects are a battle between horsemen armed with a spear and a little square shield, or sometimes a Viking ship. Occasionally these are mere grotesques or caricatures. Cattle, reindeer, rabbit, fox or dog, wheels, and other ornaments, may be made out. One of the most remarkable is a conventional human figure holding a great war-axe.

According to Duchaillu, turtles, ostriches, and camels are shown in some of these rock pictures. He also points out that the ancient Scandinavians used a peculiar helmet with two horns.[3] According to him, similar horned helmets are shown in Egyptian hieroglyphs, recording a sea-fight in the times of Rameses III. These drawings seem to have been found as far north as Drontheim, but chiefly in Bohuslan and Scania, Sweden. It is quite clear that they belong to either the Bronze or Iron Age, and are the work of Vikings or their slaves. The bronze axe mentioned above seems to belong to the Third Period of Montelius, which may perhaps be put at from 1700 to 1400 B.C. (Britain). The fight of Rameses III. is placed at about 1200 B.C. But we have no reason to suppose that all the rock drawings are of one age; so, seeing that it is generally admitted that fair-haired warriors of the northern race took part in the great attack on Egypt recorded in the tablets of Medinet-Abou, it seems that some of these may have come from the Baltic. Descendants of the original round-headed, or brachycephalic, people are said to still live in this part of Norway. These (see p. 196) belonged to a race which made drawings similar to those of the Eskimo.

They had been no doubt for generations more or less slaves to the much stronger race to which the Vikings belonged. If we take their entrance into this district as about then, they would seem to have retained their habit of scribbling on rocks until somewhere between 1700 and 1200 B.C. In the Italian Maritime Alps a whole series of rock drawings have been found. There are said to be more than 5,000 of them, and they occur high up in the mountains, between 2,000 and 2,500 metres altitude—that is, above the limit of trees and of pasture. They resemble in style those of Sweden. Many seem to be heads of oxen or other animals. Sometimes the view is as if one was looking down on two oxen drawing a plough, guided by a man with a goad. There are also arms of various kinds, such as swords, tridents, etc. These are clearly of the Bronze Age, and probably belong to a rather later period than those of Sweden.[4] Here, also, one seems to see slaves (of Ligurian or perhaps Cromagnon descent) amusing themselves whilst guarding the sheep and goats of some fierce northern master.

Crossing the Mediterranean to Algeria, we find that rock drawings are extremely common. These have been studied with the greatest possible care. It seems clear that some of them go back to a very distant antiquity, for the buffalo (*Bubalus antiquus*), elephant, rhinoceros, giraffe, and a whole series of other animals are shown. Some of these have long been extinct in this district. Nevertheless, there are others in which men are shown riding horses, or even camels, and also others, which are obviously quite modern. Amongst the former there are some representing Numidian horsemen, which resemble very closely in style those of the Swedish coast; only the shield is round, and javelins are carried.[5] It is perhaps this point that is the most interesting feature of these Algerian drawings, for it shows that the enjoyment of, and perhaps a certain facility in, this sort of amusement has continued in this district perhaps from the

days of the Bushman ancestor right down to our own times.

But we have to confess that, though we have tried honestly to admire these Algerian drawings, we cannot help feeling that any Bushman of even average ability would probably feel heartily ashamed of his descendants' artistic efforts.[6] In South America rock drawings are found on, for instance, the Casiquiari River at certain waterfalls, which are difficult to pass in canoes. They are still made by the modern Indians, who use a quartz crystal, and engrave all sorts of figures on smooth granite rocks. They are supposed by most travellers to be entirely without any meaning or any significance; nevertheless, the figure 4 occurs, a torpedo fish, and also concentric circles and certain signs, which remind one of the hieroglyphs of the Mexican or other South American culture zone.

One set seems to be a sort of map of the river, perhaps done with a view to guiding a second party. Others, again, are childish, in the sense that they resemble the work of Isaac Glas, aged seven, and of a young Parisian, aged three years, and others collected by Professor Hamy[7] (see p. 272). It is because we think one of these drawings may be a sort of map that they are mentioned here. Nevertheless, some are meaningless scribbles; others may be letters or figures; others, again, such as the torpedo-fish, may have something to do with magic or ceremonial.[8]

There is the same curious mingling, probably of all these varied elements, in the drawings of the Australian aborigines.

That the Australians could, if they chose, write a sort of picture letter seems certain. An Australian from Lake Tyrrell drew on a piece of bark a very charming little drawing. There are no less than forty figures represented, such as emus or cassowaries, kangaroos, a man steering a raft or boat of reeds, others throwing a boomerang or

dancing. One remarkable point is that there are several trees sketched with great skill. This is most unusual, and, so far as we know, almost unique in the records of aboriginal art. This native, however, had been under European influence, and most Australian drawings belong typically to the kind that have been modified and transformed by magicians or other wise men.

So, for example, at Undiaru, a particular rock was covered with white or red stripes. This was supposed to increase the number of kangaroos. A whole series of elaborate and meaningless designs were used by the Australian aborigines. Sometimes a reason can be distinguished for these ceremonies, but more often not. During initiation the bodies of the young men were covered with arrangements of red and white down, supposed to be of some mystic meaning, but in reality the reason was extremely simple. As the down had to be attached with the patient's *own blood*, he was kept so weak from loss of blood that the old men could do exactly what they liked with him.[9]

Perhaps the most interesting examples of Australian art are those curious snake or serpent images made on a mound of fine sand, sprinkled with water and smoothed with the hand. These may be 15 feet long and 2 feet high, tapering to each end and covered with designs partly red and white down, partly drawn with grease, charcoal and red ochre. The snake is the leading motive in this decoration. Another very common figure found on their churingas, as well as painted on their own bodies, is the concentric circle or cup-and-ring mark—often one or two white and three black or red circles. These are drawn on the ground by the old men without the help of a compass.[10] In the cavern of Altamira (Spain) there are, amongst other remarkable designs, undulating scalariform ribbons winding in a serpentine fashion, and usually coloured red. The black figures in the same cave are just as varied. Some will have to be mentioned later,

but there are drawings which perhaps resemble an Australian shield.

In the French Magdalenian period also the concentric circle is found as an ornament or decoration. But there are resemblances to these Australian designs also in ancient America. Thus in California the Luiseno Indians make curious sand drawings, in which one with three concentric circles is conspicuous. This is said to represent the world. This figure, as a decoration, occurs in the Yemen Plateau, New Mexico, and also in a modified form amongst the rude rock drawings of some South American savages.[11]

But of all signs and figures, the cup-and-ring mark is perhaps the most ubiquitous and mysterious (see p. 308). It would, of course, be ridiculous to suppose that because it occurs in Magdalenian France, Mexico, and Brazil, and also in Australia, that these countries had similar magic. Australian magic symbolism was perhaps of a rather hap-hazard and muddled character. But in other countries a sort of esoteric style of drawing crammed full of symbolism and magic developed to an extent almost incredible.

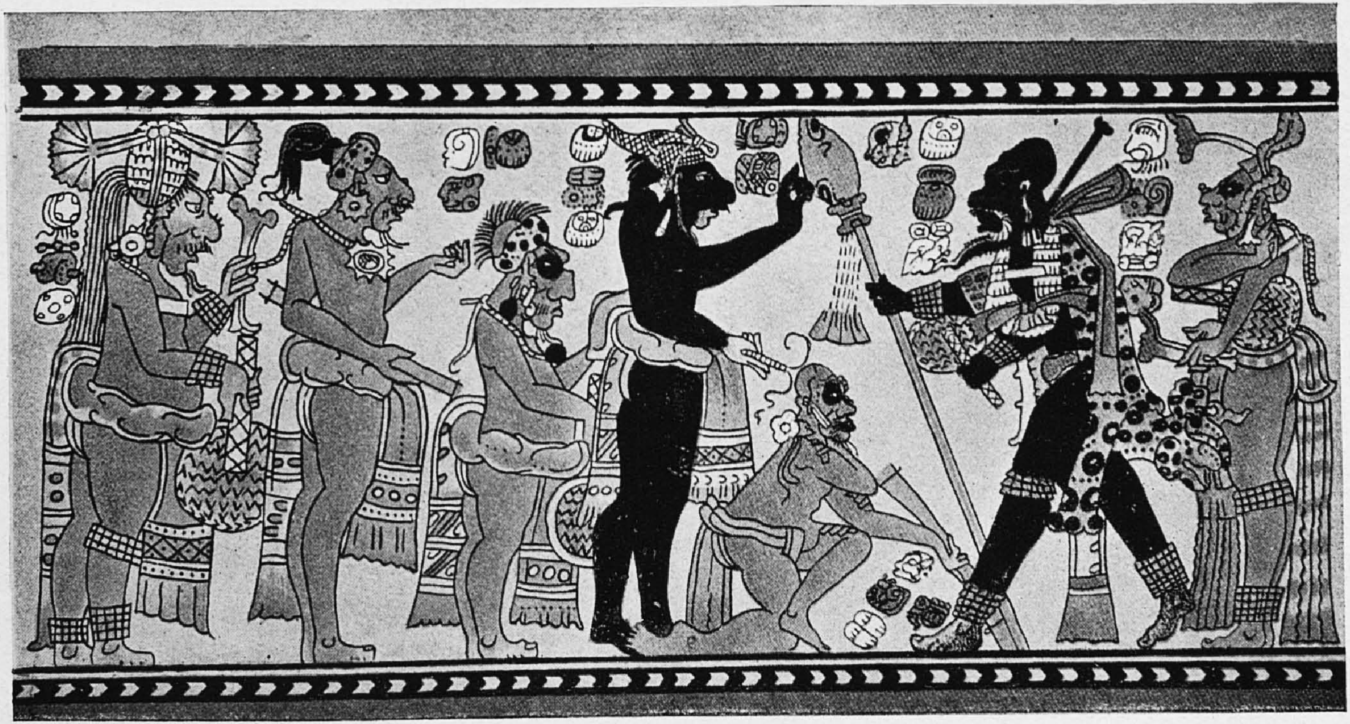
One of the most remarkable of all is that of Mexico. We have chosen the Chama Vase, which was found in a temple mound in the valley of the same name. Naming the figures A, B, C, D, E, from left to right, the chief points about—

A are his huge head-dress, a wart on the nose with bristles; he carries a bone, painted red, and a three-lashed scourge. He may be a warrior about to enjoy a feast (note the bones), and has captured an enemy (E).

B is a warrior, and holds the wooden fire-drill.

C, a corpulent person with the soplador or fan for keeping the sacred fire going, wears a jaguar skin. He may be the presiding officer of the feast.

D, probably the chief priest, as seen by his checquered cap; he has a two-lashed scourge, and raises one hand in supplication. Possibly he claims the next figure as a sacrifice, and would probably be quite ready either to



The Well-known Chama Vase

For description see Text

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sacrifice the victim or enjoy the feast; for, as is suggested by Seler, the black paint on his body shows that he has fasted for thirteen days.

E. This seems the captive or sacrifice. He holds a broken spear, and has been wounded by an arrow. Note especially the agonized motion of the hand. The flower represents blood.

F, another warrior, with a gala lance having a flint blade. He has everything handsome about him—*e.g.*, a jaguar skin, cloth anklets, mask of black monkey, the fan and rattles, etc.

G seems to be scourging himself.

It is not surprising that these suggested explanations should be not universally accepted. Thus Seler supposes that the whole scene simply represents the arrival of an embassy.[12]

Buddhism became at a very early period also overlaid with an extraordinary complex of symbolic representation. The story of the magic bowl, which was painted on silk about A.D. 1369, refers to the desire of Buddha to convert a certain demon mother who had had 10,000 children in consequence of her habit of killing and eating the children of man. He placed her youngest child in the bowl, but she was unable to lift it. Min Tsungi, of Ch'angchow, remarked: "On inspecting this scroll, I drew three deep sighs, but refrained from asking who made the picture."[13] One might also say that a very large part of Egyptian, Cretan, and other early art is also overlaid and made unintelligible by a mass of elaborate symbolism, of which the meaning seems to be for ever lost.

But in these countries, a much simpler development seems to have altered the character of art at a very early period. So long as an artist was allowed to work at his own sweet will, it did not matter very much whether the results were good or bad. If bad, he probably gave up the habit. But when a King or other ruler employs artists to immortalize his conquests and decorate his court, then

the conditions are altogether different. A recognized style and conventional type became necessary, for then both the ruler, and contractor who supplies the labour, know exactly how many yards of decoration they are to produce. There can be no subsequent dispute about the quality of the goods supplied.

Originality would be an unmitigated nuisance, for no one could tell him how the great King or priest would take it. Very likely he would have the contractor beheaded. This explains (up to a certain point) why originality is so rare. The African negro, who is not very artistic, has a more than usual skill in carving wooden statuettes. They seem to be intended to be images of Kings, and are really well done. But one notices at once that they are after a conventional pattern. The head is large, even grotesquely so; the figures are seated, and cross-legged, and in other details resemble one another closely. So that even in the Congo, which seems the centre of this peculiar form of art, conventionalism is prevalent[14] (see p. 240).

In some of the Egyptian rock tombs, the preparation of the painting was a most elaborate affair, requiring a whole series of craftsmen. The process is thus described by Somers Clarke.[15] The first rough cutting out of the tomb was done by hewers; then masons prepared the walls, which are often not straight. Holes and cracks were then plastered over with a mixture of Nile mud, cow-dung, and straw.

Then the surface was carefully rubbed or polished with stone rubbers. The next process was to cover the whole of it with a fine coat of white stucco, on which were ruled vertical and horizontal lines from 2 inches to $\frac{9}{16}$ of an inch apart. These were intended to guide the draughtsman.

The figure was then drawn in red or black over the surface. The next stage was the cutting out of the figure in relief. It was first done probably by a slave, and then finished by the sculptor. Then all was covered with a

fine white glaze. At last, upon this prepared surface, the details were painted. The painting was often minutely neat and delicate, every scale of a fish or bird's feather being carefully represented. It will be observed how well this style of work lent itself to slaveholders, and it is surely inevitable that it should become conventional.

The earliest of all these conventional developments of

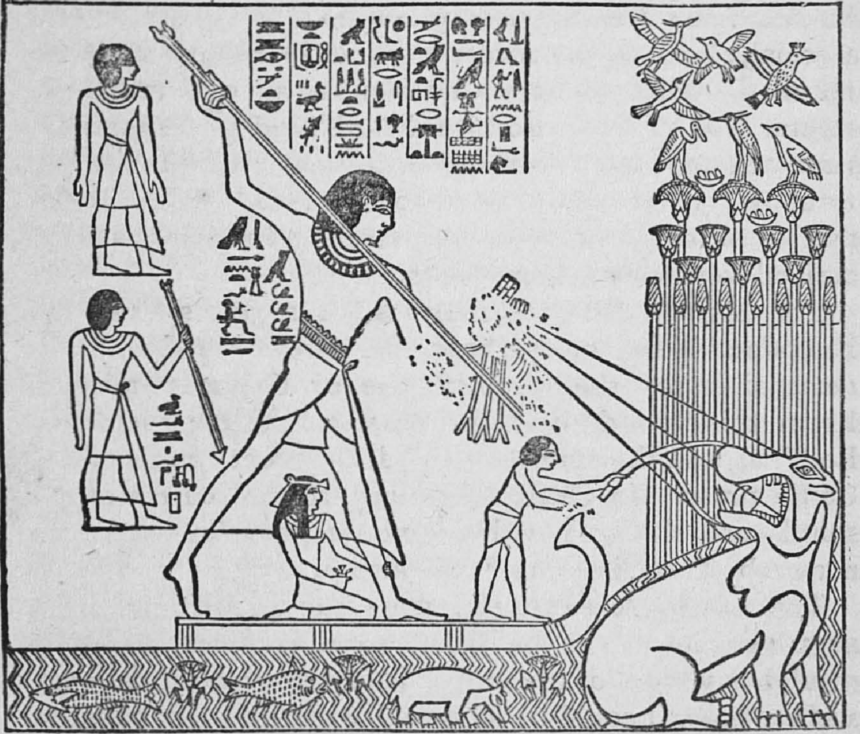


FIG. 28.—HARPOONS USED FOR HUNTING HIPPOPOTAMUS IN ANCIENT EGYPT.

(Author, *Romance of Savage Life.*)

art is, perhaps, the steatopygic statuette, which seems to have been produced as an amulet or charm in Magdalenian times. It is hardly necessary to show how greatly the artistic production of Crete was hampered by this inevitable conventional tendency. The cuttlefish ornament turns up in degraded and sometimes barely recognizable variations in Rhodes, Cyprus, Philistia, and even in

Spain, where it is only after some careful comparison that the original model becomes evident.

Even more remarkable perhaps is the curious manner in which, in savage Borneo, what was intended originally to be the picture of a dog becomes a bewildering tracery of meaningless twiddles and curves. This is beautifully brought out in the sumptuous illustrations of Hose and MacDougall's *Pagan Tribes of Borneo*. We mention this especially because the reader will find in examples of Irish art of Christian or late Celtic times an extraordinarily similar love of fantastic bird, lizard, or dog-like animals, stretched out lengthwise, and with tongue, tails forking or winding in strange and curious curves.[16] The actual motive of some of the decorative ornaments has been derived from very ancient types.

For example, Mr. Romilly Allen suggests that the Egyptian lotus, or perhaps the Greek anthemion, is responsible for the scroll foliage of Etruscan mirrors. From this was derived the common foliage motive of La Tène, and the trumpet-shaped, divergent spirals of late Celtic times. In Celtic Christian art the centres of the spirals are arranged with geometric precision, and connected by **C** or **S** curves[17] (see also p. 311).

The whole development, from the prehistoric artist amusing himself as he liked, to a complex, carefully regulated science of ornament, is of the greatest interest, and we think it could be followed in almost every country. We shall just mention a curious little point which seems worth further examination. Certain pottery from the Congo shows conclusively the source from which the decoration has arisen. The pots were intended to be carried about, and consequently a sort of handle or loop of string was made. One end of this loop was tied to a series of windings round the neck of the pot. The other was attached to diagonally-running bands of string or network round the bulging and curved lower surface. When handles were made of clay, the spiral lines round

the neck and the diagonal bands below were copied as ornaments on the surface. Having become the correct form of decoration, they appeared on pots which have no handles.

The distinctive designs of pottery in the Neolithic and Bronze Ages have been closely studied, and explain many obscure points in the story of prehistoric man.

Not only the pottery, but the common baskets of prehistoric man, were most carefully decorated. The Pomo Indians, for instance, have 840 patterns for baskets, with all sorts of curious effects produced by diagonal, zigzag, chessboard, and other ornaments. These have been collected by Barrett,[18] and worked out in the most careful and thorough manner. The conclusion to which one is forced is that prehistoric man was much more fond of ornament than is perhaps the case to-day. But, strangely enough, he seems to have been extraordinarily conservative in his tastes, disliking and being afraid of anything new and original.

Here, again, we find the radically conservative bias to which we have already alluded.

[1] Stieda and Bogorras, *Arch. f. Anthrop.*, 1907, p. 213.

[2] See Frobenius, *Childhood of Man*, where this question is very fully considered with an abundance of illustrations.

[3] Duchaillu, *The Viking Age*, 1889.

[4] Bicknell, *L'Anthropologie*, 1905, p. 337. I have been unable to obtain the original paper.

[5] Gautier, *L'Anthropologie*, 1907, p. 58.

[6] Flamand, "Hadjirat Mektoubat," Lyon, 1902 (see *L'Anthropologie*, 1902).

[7] Hamy, *L'Anthropologie*, 1908.

[8] Spruce, *Notes of a Botanist on the Amazons*, 1908; Vierkandt, *Arch. f. Anthrop.*, 1908-09.

[9] *Cf.* Spencer and Gillen, *Across Australia*, 1912.

[10] Spencer and Gillen, *loc. cit.*

[11] Dubois, Univ. Calif. Publ. Am. Arch. and Ethn., June 27, 1908; Hewett, Bur. Am. Ethn., 1906, 32; Spruce, *loc. cit.*

[12] Seler, Försteman, etc., Bur. Am. Ethn., 1904, 28.

[13] Franks, *Archæologia*, vol. liii., part i.

[14] Ankerman, *Arch. f. Anthrop.*, 1905-06; Joyce, *Man*, 1910, 1.

[15] *Archæologia*, 1894, vol. lv., part i.

[16] Proc. Ant. Soc., Scot., 1879-80.

[17] *Archæologia*, vol. lvi., part i.

[18] Barrett, Univ. Coll. Publ. Am. Arch. and Ethn., December, 1908.

CHAPTER XX

LETTERS, NUMBERS, WEIGHTS, AND MONEY

Of course prehistoric man never had to learn any sort of alphabet, yet there were probably signs or symbols to which a definite meaning was attached. We have seen that picture messages exist amongst the Red Indians, who were not higher in the social scale than the men of Cromagnon. The Bushmen represented hunting scenes, and so also did the Eskimo. Even the Veddah cuts on a tree a rude notice to trespassers, which seems to be a definite sign of the same general character as many prehistoric symbols. The idea that a particular sign represents some definite person or thing exists even among the Red Indian, for the figure of a running antelope is placed as a sort of signature to the drawings which represent the life and adventures of the Indian chief called by this name (see p. 299).[1]

According to the best authorities on prehistoric art, some of the Magdalenian pictures appear to be signed by the artist's own mark. That being so, it is in the highest degree improbable that the Magdalenians did not use their powers of drawing to convey simple messages to friends or enemies. Such messages might be invaluable to them perhaps, providing the means of escape from almost inevitable death.

Moreover the reasonable and obvious meaning of many scratches and cuts on their weapons is surely an owner's mark of a distinctive character.

We cannot say whether pictures or mere scratches were used in the most primitive system *of communication.*

Early in the Aurignacian period both rude drawings, ornamental marks, and scratches without apparent meaning are found. There is nothing to show definitely whether the first marks were rude picture drawings or mere scratches.[2]

But even in Magdalenian times the process of conventionalizing had begun. M. Breuil has a series of figures showing how the horse's head became degraded and more or less stylicized even during the Palæolithic period. So

FIG. 29.—A RED INDIAN DRAWING.
Running Antelope, who signs the drawing, shows how he shot and killed an enemy.

(Frobenius, *Childhood of Man.*)

also the bison's horn and eye has become, in his view, an ornamental design almost unrecognizable.

If these drawings during the late Palæolithic became modified for the sake of decorative ornament only, there is no particular reason why they should not have become altered in the same way when and if they were used for picture messages. As a matter of fact, several signs in the caves of the Pyrenees do resemble letters of the Phœnician, Old Greek, and Cypriot alphabets. In Mas

d'Azil the letters E, F, I, O, M have been found; at Altamira V, I, X, W, Y; by which we mean that there are forms which one can interpret as the original of these capital letters *if one is so disposed.* Another sign which seems to be common in Altamira is apparently a sort of throwing spear with a few feathers or barbs at one end and a fine bone tip. It seems to have been a kind of hand-thrown arrow, so to speak, and resembles closely the "Adium" spear of the Shilluk, which is still (or was recently) in use.[3]

Sometimes one finds in the caverns the whole arrow shown with either a fine straight point or what may be a barb-like point. In other cases only the base with the feathers. In these last, there is a resemblance to some early forms of the letter *e* in late prehistoric, first, and twelfth dynasty, as well as in Roman Egypt, in Lydia, North and South Spain, and Crete.[4] There are many other characters in Petrie's Formation of the Alphabet which are very like certain drawings in the cavern of Mas d'Azil, Altamira, etc.

It is impossible for anyone who is not resident in Paris to obtain a full series of all those signs which may have been letters, or rather symbols, in the Magdalenian Age of France. But a few of them may be given here, though these are in all probability a very small proportion of those which might be quoted.

Besides E, F, I, O, M, V, X, W, Y, there is the arrow-head, our Government mark, and the circle with a dot in the centre (see p. 308). Also almost all the forms given under *g*, line 21, Plate III.; some signs extremely like the handled gridiron type of *ss* or *s* (56, 57 *loc. cit.*); also *ts* and *ty* (58). See Petrie, *loc. cit.* We think a close search of the French record would reveal a much larger number of similar, though not quite identical, signs. So one finds a gridiron-like figure and the base of the arrow with many feathers in Minoan III., Crete.[5]

But to show how dangerous such comparisons may be, let us take three figures said to have been engraved on

rocks near a waterfall on the Casaquiari River[6] in South America. One of these is 4—that is, North and South Spanish *r* of Petrie. Another is the Cypriot *y*, apparently of value *u*. This, or something very like, is also a conventional derivative of the human figure at Albacete, in drawings just after Magdalenian times.[7] And the third closely resembles (fifth line from top, Plate V., Petrie, *loc. cit.*) an aphonic sign of the Egyptian twelfth dynasty. Very likely some Spanish soldier may have made the 4, which has a modern appearance, but it is obviously impossible to think that the savages of the Amazon should have borrowed letters from Cyprus or Egypt, so that one is obliged to suppose these particular likenesses are merely coincidences. But there are one or two considerations which throw a little light on this difficult question. Let us try to imagine what prehistoric man wanted such signs for, supposing that he used them for simple messages. He might require a mark for every kind of game, something representing each of his weapons, his hut, or his cave.

He would no doubt find it useful to describe the country, or to show where he was going, and when he was coming back. These signs would have to be intelligible, but also they must be easily made without unnecessary trouble or loss of time. Now, if one tries to imagine—remembering that the signs were scratched on rock with a flint tool—what were the very simplest and easiest marks that he could make, then surely I, V, Y, O, M, W are just those which would come readiest, almost of themselves, to his hand.

A large proportion of the figures in the French caverns seem to be of this simple character. Those marks which almost come of themselves when one is working with a knife on wood, or scratching stone with a flint point, may have been invented as signs over and over again. They would always be chosen for trade symbols because of their convenience.

So also the arrowhead may have been used as a sign by the Palæolithic people, and also by the Neolithic, and yet invented independently by both of them as a convenient means of barter. The letters E and F cannot be objected to on this ground. Even with them, however, there may be some little doubt. There is an Indian drawing which might be read as an F lying on its side. This, however, is a rough illustration of a stick placed so as to point in a certain direction, and with two uprights. This meant that the Indian who made it had gone in that direction, and would be away for two days.[8]

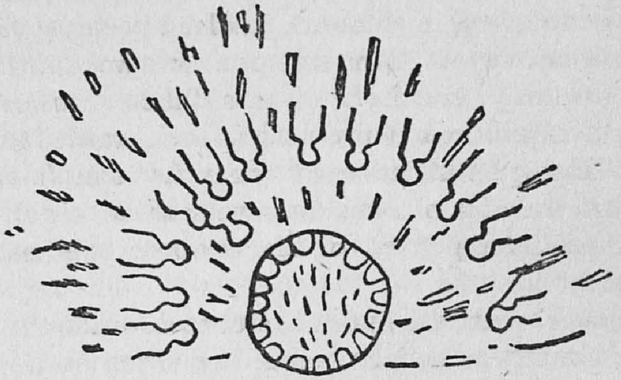


FIG. 30.—RED INDIAN DRAWING.

The story of an attack on a stockade by the Crow Indians. Bullets are flying through the air, and thirteen men are wounded.

(Frobenius, *Childhood of Man.*)

One drawing in the French caverns looks very much as if it was a sort of signpost of this nature (see p. 286). It is very hard to believe that a people so intelligent as the Magdalenians had no system of communication. They were, so far as one can judge from their remains and their skulls, far above the Red Indian in every respect. They had also invented a real system of decorative art. The more or less conventionalized ornament of their *bâtons de commandement* and the like seem to prove this. When this artistic race then stooped to degrade its drawing to

commonplace business uses, a selection would be made of their usual figures. Those signs that survived in common use would be just those that were most distinctive and easy to make. Unfortunately we are not yet in a position to trace the connection between their signs and the common signary of the Mediterranean, which is supposed by Flinders Petrie to have preceded all the alphabets.

One curious little point might be mentioned. A stag's head, more or less conventionalized, is found on Magdalenian ornaments. A similar stag's antler also seems to occur on very ancient Chinese designs of about 1200 B.C. Other figures which occur with it, and also on ancient Chinese bronzes, do show a distinct similarity to some of the Magdalenian signs. It seems probable enough that there is a continuity here, for we have both a similarity in the sign and also know what it was originally intended to mean. But no such continuity is known in the region of the Mediterranean. Let us suppose that in Late Palæolithic times there had been a selection of the fittest amongst the many signs used by the Magdalenians, and that they were accustomed to use these for barter and for communication (not, of course, as syllables, still less as letters).

Now, in the Late Neolithic period, there seems to be proof that a fairly advanced civilization existed not only in Elam, where written inscriptions are said to go back to 5000 B.C., but also in the Ægean, in Egypt, in Crete, perhaps in Spain, and also even as far as Britain. Unfortunately no records of Late Neolithic time throw any light on the signs or symbols. Yet their priests observed the rising and setting of stars, which means that they must have had symbols of some sort. Stonehenge could not have been built by a race which had no means of sending the simplest message. They probably carried on trade, and, as we have seen, cultivated the soil in the same way, and had the same domestic animals along the whole Mediterranean coast, and as far to the west and north as Scotland, where Callernish, Lewis, was built

about 1800 B.C. Then came the invasions of the northern race, especially in Italy, Greece, Asia Minor, and perhaps as far as Egypt.

Now, if there was a common sign language current all over the Late Neolithic Mediterranean, there should be just the sort of similarity that Flinders Petrie shows between the Runes of the Far West and the Levantine groups. The handiest and most suitable signs would on the whole survive, in spite of all disturbing influences. These invasions of the northern barbarians might introduce a few new signs, and alter the meanings of the old ones, yet they could not destroy the whole series of signs.

About 1500 B.C. the Phœnicians were the great trading nation of the Mediterranean—at least, they are known to have exported silver from Spain to the East at about this date, which seems to show that they carried on a very extensive commerce. It follows from this that they would naturally have much to do with the modification of the signs and the establishment of alphabets.[9] The only gap between the use of such signs as the arrowhead, the circle, I, E, F, M, V, X, Y, and perhaps *Z*, by the Mas d'Azil savages and by us ourselves is therefore in the interval between Late Palæolithic and Late Neolithic.

As we have seen, there was communication between the Magdalenians and the Neolithic villages. One is also, perhaps, too apt to suppose that the Magdalenians were the most progressive people of their day. It is quite possible that they did not invent these signs, but borrowed them from Spain or Africa, so that the symbols may have originated in Africa or the East. But though these signs may have been originally mere trading-marks or symbols, "spread by traffic far and wide," they were long afterwards "slowly contracted and systematized until . . . reduced to a fixed alphabet."[10] This change involved at least two great mental achievements, or "wrenches," of the brain, as Petrie puts it. It would be

interesting to know who made this great advance, but we do not.

In early times the Egyptians spelled words alphabetically, but they never carried through this invention. Their writing was artistic, decorative, in the highest degree obscure, anything but business-like, as was inevitable in a magician-ridden country. So also in Japan and China, artistic and literary influences have retained to our own times an unbusiness-like method of writing. It seems most probable that the alphabet was invented in some part of the Ægean Sea, where the original Mediterranean people, keen Phœnician traders, the Alpine and northern barbarians, traded and fought with one another. At any rate, in Crete, this invention seems to have been made before 1300 B.C.

The use of numbers seems to have already existed in the cavern of Mas d'Azil. There are strokes which certainly look like tallies. The Roman numerals V and X also occur in a rough form in the Palæolithic period.

But amongst savages counting is almost invariably done by touching fingers and thumbs up to ten, then using the toes up to twenty.

Now, in several of the French caves one finds the impressions of hands. Very often one or more fingers are doubled in; sometimes it looks as if the finger had been cut off at the second joint. The rock seems to have been covered with grease or some sticky substance, then a red or black powder was blown over the hand, so that an impression of the palm and fingers was left on the wall. These impressions of hands with lopped fingers are generally explained as some form of magic. Similar figures are found in Australia, and it is often suggested that there is a connection between these ancient doubled-in fingers and the mutilations practised by some savages, who cut off a finger-joint as a sort of sacrifice to luck.

But why not accept the obvious explanation that these

hands represent numbers? Perhaps they may be a primitive game-book; perhaps the very first debtor's account? The universal habit of counting by the fingers makes this theory surely more probable than that of some unknown magic. The explanation given by the Australian old men to-day is hardly likely to apply to the Palæolithic Magdalenians. In some tribes of India magic is actually the explanation of similar signs. When there is a marriage amongst the Madigas, an animal is sacrificed, and the person who slaughters it places his blood-stained hand against the

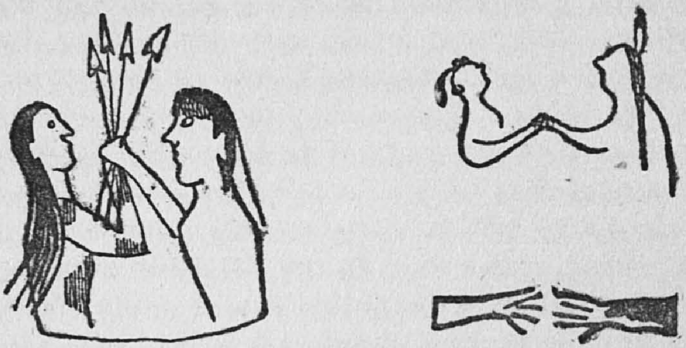


FIG. 31.—TREATIES OF PEACE.
Red Indians exchanging weapons or shaking hands.
(Frobenius, *Childhood of Man.*)

wall of the house to avert the evil eye.[11] Whether some early signs represent hands or not is quite uncertain; certain symbols look very much as if they had been originally hands (*e.g.*, Petrie, *loc. cit.*, Hagia Triada, right-hand figure, middle sign). This may also have been the first meaning of the gridiron figure.

The first appearance of the Arabic numerals is said to be on the *Codex Vigilianus*, in the monastery of Albelde, near Logrono, about A.D. 976. The letters 1, 7, 8, 9, had even then their usual appearance.[12]

The introduction of weights and measures goes far back beyond the historic period. This subject has been

treated in so clear and interesting a way by Professor Ridgway[13] that it is unnecessary to devote more than a very few lines to it. As for counting, so for measures; the human hand or foot is at the base of almost all natural systems. Weight could hardly be a matter of much importance until agriculture had advanced to such a stage that trade in corn was possible. Seeds were used almost everywhere as a base of weights, and even for the measures of length and capacity.

In Peru seeds were used by the Incas as units. The smallest Greek weight was a barleycorn, and our own Troy grain seems to have been originally a grain. The pennyweight was thirty-two grains of wheat. In China ten millet grains measure an inch, and 10 inches a foot.[14] Millet seed was used as a measure of capacity, and seeds are even now employed by anthropologists in measuring the capacity of skulls. The gold unit in ancient Egypt was the value of one cow, and varied from 120 to 140 Troy grains. Our own sovereign weighs 120½ grains, and is therefore very nearly the old value of a cow. All sorts of things have been used as money. The manufacture of shell-money is even to-day a thriving industry in the Solomon Islands. The shells are broken with a stone hammer, chipped roughly into the right shape, then smoothed and ground flat. A hole is drilled in them by a bow-drill tipped with flint.[15]

The writer has had practical experience in the use of cloth as money. Bales of cloth were carried for months, and at every payment they had to be unrolled, and a porter's arm from the elbow to the forefinger used as the measure. When we had to pay our own porters their food allowance, the man selected by them was invariably he who had the longest forearm. When the headman bought from the aborigines, the man chosen by him had the shortest arm in the caravan. Hence palavers, which had to be put right by interference of the "bwana." Perhaps it is difficult to realize that long before the in-

vention of metals, trade, commerce, language, messages, art, and music were thriving. This must be so, for the complex civilizations of prehistory involve these advances.

Before leaving this subject, it is necessary to mention the much-discussed cup-and-ring marks. These are, in their simplest possible form, small roundish hollows in natural rocks. As a rule they are on boulders sloping in any direction, very often on those which have been polished smooth by ice. The cups are from a little below to a little more than an inch in length, sometimes circular, often elliptic, and may be half to an inch in depth. The simplest examples are in no order, at least so far as one can detect. In many places, however, they are arranged in regular series, sometimes in parallel rows.

The more advanced kinds of cup mark are surrounded by two, three, or even five rings, or concentric circles. Not quite so common are similar signs, but with a groove cut through the circles to the central hollow. There are all sorts of modifications of these, such as spirals and other more or less ornamental devices, but the cup mark and the type with concentric circles is by far the most interesting and the most widely distributed.

It is quite impossible to give a complete distribution of the typical cup-and-ring mark.[16] In the British Islands they are exceedingly common. The author found some excellent specimens at Carleton Fell, Glasserton, in Wigtonshire, and they are specially abundant in Inverness-shire, Nairn, Forfar, Perth, and Argyll. They have been detected in the Orkneys, Isle of Man, Ireland, and specially in Northumberland and Yorkshire in England.[17] In Europe they have been found in Scandinavia, Brittany, Spain, Italy, Greece, as well as in India, Tibet, China, the Fiji Islands, New Caledonia,[18] and Easter Island. In North America they are the subject of one of the sand drawings of the Luiseno Indians,[19] and in South America they occur on the paddles of the

Bakairis.[20] They are also found on the Australian churingas.

As to their distribution in time, they are very often found on the slabs of dolmens or on rocks in the vicinity of stone circles and other Neolithic remains.

But this is not always the case. Those in Wigtonshire, for instance, are not near any known stone circle. In France they have been discovered in certain passes which were probably trade routes in Neolithic times. There is at least a strong probability that they were made in the polished Stone period. Yet the sign itself is of much older date than the Neolithic period. There is a row of concentric circles quite distinct and clear, etched on a bone *batôn de commandement*, found in the cave of Arudy, France, that is of Magdalenian age. This means that the sign itself dates back to at least the Magdalenian of Europe. On the other hand, they cease, according to the high authority of M. Cartailhac, before the Bronze Age. Perhaps *Homo Europæus*, the "greasy seven-foot giants" of that period, did not bother with symbolism of this kind.

The explanations of cup-and-ring markings seem to depend for some mysterious reason on the idiosyncrasy of whoever tries to explain them.

Thus they have been supposed to be (1) symbols of sun and star worship by those who are obsessed with the dawn-myth theory; as (2) emblems of serpent worship; as (3) representing the reproductive power of Nature by those who seem to find phallic worship everywhere; as (4) embryonic maps showing where the prehistoric wanderer could find shelter; (5) as natural tables for playing some early kind of fox-and-goose, solitaire, or other childish game; (6) as a prehistoric form of writing, arranged something after the Morse system; and, of course, (7) as "totemistic" by those who allow the shadow of the Arunta and Australian phratries to affect all their beliefs in anthropology. This last explanation must be rejected. It depends on several assumptions or

"axioms" which cannot be accepted, at least by us. We do not believe, for instance, that there is a single one amongst the French prehistorians who would accept Mr. Astley's "axiom" that "primitive man does not give himself trouble merely for an æsthetic purpose." It is only necessary to examine the series of engravings and paintings in any one of the French caverns, and, or at least it seems so to us, one sees that this axiom is quite unfounded.

The Australians are but one of many races who have used this particular symbol. They are neither in a Palæolithic nor in a Neolithic stage, but under conditions quite exceptional and peculiar. Even if the Australians had a special and intelligible explanation of these symbols (which is not the case), it would not be safe to take the Australian explanation as applying to the later Neolithic people in Europe. The sixth theory has been put forward in a very attractive manner by Colonel Rivett-Carnac. It seems that the Chinese Emperor Fuh-he, who flourished at from 2852-2737 B.C., interviewed certain nomads who lived in caves near the northern frontier of the country, and who were in the habit of making round maps.

It is not quite clear whether the Emperor learnt a sort of script from these sage cave-dwellers, or if he invented a kind of Morse alphabet, using their black-and-white cup-marks as dot and dash.

But in the book *Yh King* it is explained that "production and reproduction is what is called the process of change." This means essentially the third explanation (see below). Many cup-and-ring, and especially cup, marks, can hardly be intended as symbolic writing, for the distribution of the marks on a rock is often in the highest degree irregular. Nor is the map theory (4) satisfactory. The regular rows of many cup-marks are quite unlike a map. Yet this theory seems to have been held by the Emperor Fuh-he himself, for one of his explanations is called "the map of the Ho River." The fox-and-goose

explanation (6) is also impossible, for marks are found on the under-sides of dolmen stones. They are very seldom on flat stones, which would be the only ones possible for games of this kind.

There is really nothing to suggest serpent-worship in the more usual varieties of these signs, so that we are left with sun-worship and the adoration of the reproductive force in Nature as the only explanations remaining. For the former there is some indirect probability, as the

FIG. 32.—A MAORI, TUPAI KUPA. (AFTER AN OLD WOODCUT.) (Frobenius, *Childhood of Man.*)

Mediterranean race were probably sun-worshippers. If they believed the sun to be the great reproductive, revivifying, and invigorating agent in the world, then both explanations would have a measure of truth in them. The dot in a single circle with a line from it is still in India the symbol of reproduction, and seems even in Europe to have been in a misty way connected with child-bearing.

It seems, then, that the Palæolithic Magdalenians used this simple and easily remembered sign, which was carried

on by the Late Neolithic communities, and by them distributed over the world. At first the sign may have been a mere ornament, but it was chosen to represent sometimes the sun and elsewhere the principle of reproduction.

It seems clear, however, that the cup-and-ring marks were not the only signs handed on from the Palæolithic to their Neolithic successors. There are, as we have shown above, a whole series of letters, number-signs, and others that seem to have been similarly passed on. So perhaps it is to the Palæolithic that we have to look for the origin of all reading, writing, and arithmetic. Here, again, not only the first stage, but every step in evolution is obscure. Yet the trivial, happy, vacant-minded scribbling of some intelligent savage, his curiosity regarding an odd-shaped stone, or perhaps a chance-seen resemblance of a rock outline to a horse's body—these were in all probability the origin first of art, then conventional decoration, and, finally, of reading, writing, and arithmetic.

[1] *Cf.* Frobenius, *loc. cit.* (see p. 278).
[2] Petrie supposes signs preceded pictures (*Formation of the Alphabet*, 1912).
[3] Rütimeyer, *Zeit. f. Ethn.*, 1911.
[4] Petrie, *loc. cit.*, 1912.
[5] Evans, *Archæologia*, 1905, vol. lix., part. ii.
[6] Spruce, *loc. cit.*
[7] Breuil, *L'Anthropologie*, 1912, p. 22.
[8] *Cf.* Frobenius, *loc. cit.* [9] *Cf.* Taylor. [10] Petrie, *loc. cit.*
[11] Thurston, *Man*, 1907, 19.
[12] Hill, *Archæologia*, 1910, vol. lxii., part i.
[13] *Jour. Roy. Anthrop. Inst.*, June, July, 1909.
[14] Giles, *Civilization of China*, 1911.
[15] Woodford, *Man*, 1908, 43.
[16] Distribution and theory of cup-and-ring marks has an enormous literature: Allen, Proc. Soc. Ant. Scot., 1881-82; Baildon, *Archæologia*, 1909, vol. lxi., part ii.; Rivett-Carnac, *Jour. Roy. Asiat. Soc.*, 1903; Astley, *Jour. Roy. Anthrop. Inst.*, 1911. In Scotland Mr. Coles reports that they are supposed by Highlanders to be made by adders curling themselves on the stone surface (Proc. Soc. Ant. Scot., 1902-03).
[17] *Ibid.* [18] Archambault, *L'Anthropologie*, 1901.
[19] Sparkman, *loc. cit.* [20] Von den Steinen, *loc. cit.*

CHAPTER XXI

KITCHEN MIDDENS

THE story of the first half of the newer Stone or Neolithic Age is obscure and difficult. Not for want of information, for there are enormous masses of débris, but the essential points are difficult to grasp. Nor are the physical characteristics and habits of life of these transitional folk nearly so well known as those of the Palæolithic races who preceded them. At the close of the Magdalenian, the dry cold of the Bühl period was gradually altering to a climate which, though still harsh and inclement, was by no means so inhospitable. The serious question for the last of the Magdalenians was the increasing scarcity of all those animals upon which they were accustomed to live. The mammoth had gone; not only reindeer, but bison and horses were vanishing from the Dordogne. In the country now overgrown with forests, and, in consequence, more difficult to hunt in, the greater numbers of red deer, roe, boar, and the like, did not recompense the Magdalenian for those that had disappeared. The red deer were probably much more difficult to kill and infinitely harder to discover, for they lived in a more wooded country.

In the river all sorts of fish were, however, if one can judge from later historical accounts, much more abundant than they are to-day.

According to Harris (who wrote in 1586), fat and sweet salmon were daily taken in the Thames, near London, "and that in such plenty, as no river in Europe is able to exceed it." "Haddocks could be taken up by the hand after a flood below London Bridge."[1] In fact, if, as we suspect, the

climate was then very much like that of British Columbia to-day, and the land for the most part forest-covered, salmon and other fish would probably be as plentiful in the Thames as they used to be in the Fraser River. These changes are all quite distinctly suggested by the differences apparent in the later Magdalenian of France. The growth of a fish-harpoon industry, drawings of salmon and trout, the invention of hooks, are all clearly indicated. There are also signs of a distinct falling off in general well-being. The more energetic and able-bodied had gone. Those that were left found red deer and roe much more difficult to hunt as well as harder to follow in the scrubby forest.

So they were insensibly forced to become first hunters and fishers, and then gradually to turn into fishing and shore-frequenting tribes, who lived mainly on shellfish, although they hunted anything they could find. In a continent overgrown with oak forest or Scotch-pine woods, river valleys, and especially the coast-line, must be the main highway for savage humanity.

So in this newer Stone period, it is for the most part on the seashore or on lake margins that we find the records of the first newer Stone periods. There, with oysters, mussels, periwinkles, small fish, crabs, lobsters, to say nothing of an occasional stranded whale or drowned animal, it was possible to get at least one square meal in the day at any time of year.

In a Scotch-pine wood or in the prehistoric temperate oak-forest, meals would be uncertain at all times, except during the acorn harvest and nesting season. Indeed, in winter the hunter would in all probability himself form a meal to a pack of wolves. So the Azilian people (see p. 320), who come next to the Magdalenians in time, and who occupied the Mas d'Azil and other caverns in the same district, seem in the north and west to have still used rock shelters, but to have insensibly accustomed themselves to live on oysters and shellfish. In the great

cavern of Mas d'Azil the characteristic weapon is a harpoon, or rather the head of a flat harpoon, made of red-deer antler. There are two or three recurved barbs on each side, or on one side only. It was attached to the shaft by a strip of hide or vegetable fibre, either passed through a hole made in the base of the harpoon or wound round the base above a round knob or two short barbs pointing the other way. This weapon characterizes the Azilian period. It is clearly descended from the much more beautiful reindeer harpoons of the Magdalenian. At Mas d'Azil the usual domestic implements were made of bone, and consist of awls, pins, and blunt-nosed, chisel-like bone-scrapers. They also used flint tools, but their workmanship was clumsy, inefficient, and careless. The beautiful engraving of the previous age has vanished. But scratches and simple decoration of a rude type was still continued.

The most remarkable point about them is perhaps their use of smooth pebbles, painted with dots and bands in red or black ochre. About these painted pebbles, or galets, there is the same uncertainty as that which characterizes the many strange signs of the Magdalenian caves. It is quite possible that they only represent numbers or syllables, or very simple messages. On the other hand, smooth pebbles are much used in prehistoric medicine (see p. 334), and they are usually compared to the Australian magic churingas. The people themselves seem to have been of Cromagnon type, and they used similar necklaces, made of pierced teeth, preferably of the wild boar. They were buried apparently in much the same way as the Aurignacians; red ochre was placed on the body before burial.[2] They still occasionally killed and ate bears, wolf, *Bos primigenius*, and wild boar, as well as stag, roe deer, rats, and birds. But even at Mas d'Azil they had begun to eat shellfish, for heaps of the common land-shell (*Helix nemoralis*) have been found. Fish-bones are also abundant enough.

Remains of the Azilian period, as distinguished by the characteristic harpoons, are distributed over most of Europe in a very remarkable way. They have been found in other places in France, as, *e.g.*, at Reilhac, Lot, as well as at La Madeleine. The characteristic harpoon has been found in the Swiss lake dwellings, and in a cave near Basle (see p. 318). They seem to have lived in the caves of Ojcow, near Cracow, in Poland, also at Ofnet, in Würtemburg, and at Maestricht, in Holland.

One of the most interesting Azilian colonies was that at Maglemose, near Mullerup, on the Baltic. It is supposed that they had made a huge raft of Scotch-fir logs, and built their shelters upon it.

Although the Danish kitchen middens are much later, the earliest of them contain occasional harpoons, showing that the Azilian probably frequented Denmark at a very early period. In Scotland typical Azilian remains have been found at Inchkeith, at the MacArthur Cave, and the Druimvargie rock shelter, near Oban, and also in kitchen middens on Oronsay. They seem to have lived on the Solway, for a harpoon was found in the River Dee, near Kirkcudbright. The only two English finds known to the author are the Victoria Cave, and on the shore at Whitburn, in Yorkshire.[3] We have already suggested that the Azilians were a fishing and hunting people. The oldest settlements known are in France. They may have wandered all through Europe, probably along the rivers and lakes, visiting Switzerland, and as far east as Poland. So they eventually reached the Baltic and Denmark. It is a very difficult point to understand how they got to the British Islands. But to solve this question, one must have some idea as to the date of the Azilian in France, which, of course, is a very different matter from the time when Azilians had reached the Baltic and Scotland.

Geologically their date seems to be now pretty well ascertained. Both the Oban caves and also the recent

discoveries of Henderson Bishop and Mann seem to show that they were living on the Scotch sea-coast when the sea-level was 30 to 35 feet above the present Ordnance datum. That would correspond to the Upper or Scotch pine forest of Geikie. So also at Maglemose, the Baltic was, during the presence of these Azilians, a great fresh-water lake in a Scotch-pine country. This Scotch-pine occupation preceded the oak-forest, and is well known as one of the stages in the occupation of the north by vegetation.

Sollas places the Magdalenian as at about 13000 B.C., the Azilian at 7300 B.C., and the first lake dwellings at 6000 B.C. Our difficulty in this scheme is the great interval of 6,700 years between Magdalenian and Azilian, for there is a distinct connection between Magdalenian and Azilian, a connection which seems to us too close to allow of an interval of 6,700 years between them.

But the first people in Norway—not our Azilians, but the Magdalenian hunters from the Urals and Siberia—are supposed to have entered that country at 4000 B.C. (Holst) or 5000 B.C. (Brögger).[4] We do not think that these dates are compatible with Sollas's estimate, for these Siberians were reindeer hunters, and in the Magdalenian stage. If, however, the Magdalenian is put at 12000 B.C., and the Azilian at 9000 B.C. in the south of France, and if we allow the reindeer 3,000 years to clear out of France and the southern shore of the Baltic, the Azilians might have reached Maglemose and Scotland about 6000 B.C., and may have lived there for a very long time.

If this reasoning is at all correct, the Norwegian estimates seem too recent. But if we take 6000 B.C. as the date of entry of the Magdalenians into Norway (especially if they came along the northern shore of the Baltic) the dates seem not only compatible, but even probable. A race in the stage at which the Azilians had arrived might

hardly differ in any distinguishable character during an interval of 3,000 or even more years.

Anyone who traces the history of anthropological literature during the last twenty-five years will find that the tendency has been always to date farther and farther back, and always in spite of the most strenuous opposition.

At Maglemose an extraordinary number of flint tools were found (15,500 flakes and 881 tools); they wore the ordinary necklaces of pierced teeth and hunted the red deer, elk, wild ox,[5] and wolf.

At Oban and Oronsay they seemed to have lived on the seal as well as on red deer, marten, otter, and shellfish (oyster, limpet, cockle and crabs); they also ate the great auk, which has been long extinct. They seem there to have had very few flint tools and to have used bone pins, awls, etc. Perhaps the commonest bone implement is a round-nosed chisel-like tool which is found at Oban, Druimvargie, and in three of the kitchen middens of Oronsay. They had both hammer and anvil stones.

We understand that a new find of Azilian Age has been discovered at Oronsay, but there are no published details. It seems that they had no pottery, no polished stone weapons; they had no domestic animals, not even the dog, and had no knowledge of agriculture.

Nor have any painted pebbles been discovered in the Scotch or Maglemose remains (to the author's knowledge). The remains of Azilians are rare in Central Europe, which is of course what ought to be expected if they were a scattered people of hunters and fishers. They have been found, however, besides the places given above, at Istein (South-West Baden), and recently at Birsech, near Arlesheim (Basle). These people at this last place seem to have been fairly successful as hunters, for they killed urus, red deer, goat, horse, boar, lion, as well as squirrels. They wore the usual pierced shell ornament; a lignite bead and an earring of ochre was also found.

About 122 of the characteristic galets showing traces of

colour were found, but these had all been broken. M. Sarrasin suggests that an enemy had captured the cave and broken the Azilian heirlooms.[6] These people were obviously still hunters, but in Scotland they had been forced, as we explained (see p. 314), to live by the seashore, and had become "kitchen middeners."

Along the north coast of Africa remains of Early Neolithic civilization have been traced from Egypt to the caves of Morocco and the fishing-stations at Oran, Bougie and Aumale. These are sometimes shell-heaps with pygmy flints, but are so mixed with Palæolithic and later Neolithic remains that it is hardly possibly to differentiate them. In this part of the world man was, until the Mohammedan invasion, always in the main stream of progressing civilization, and had no chance to escape from it. In Spain and Portugal there are also many shell-heaps. Those at Mugem and Salvaterra are at about 25 to 30 metres above the present shore-line. These were formed by a race partly of Cromagnon, partly of Furfooz descent, and who used pygmy flints. There are remains of Canis, Bos, Ovis, Equus, which, however, are usually said to be of wild species only, and of curved smooth stones for grinding corn. They used horn and bone for chisels, pointers, etc.

One cannot help a suspicion that they were perhaps an outcast community belonging to the later Neolithic. It seems extremely remarkable that dog, cattle, sheep, and horse should all be found in the middens, and yet be all wild. In England there are many kitchen middens, but mostly associated with pygmy flints. Those of Scotland, besides Oban and Oronsay, which are probably of Azilian Age, seem to belong to every stage of civilization from the very earliest Neolithic to the Second Bronze period. On Culbin Sands (Elgin), there are stone rings and stone mullers which resemble exactly those found in the sandhills of Patagonia by Hrdlicka. Anvil stones also occur in both these widely different spots. At Keiss in the far north also there are kitchen middens, but these belong to

a pastoral people with all the usual animals, even the horse and pig. Still they are of ancient date, for both the great and lesser auk are found in them.

Perhaps even more remarkable are those which occur just above the 30 feet beach near Stirling, and which in all probability belong to the Azilian. Stranded whales seem to have been not infrequent, and an early type of deer-horn pick-handle with a stone adze was used to cut up the blubber. We have given but a few selected cases to show the wide distribution of these kitchen middens. It seems that, especially in the temperate or colder temperate zones, there is hardly any seashore in the world which has not at some period been a refuge or favourite resort of savage humanity at a certain stage of civilization. The kitchen middeners of Africa, Portugal, and Italy were for the most part of Mediterranean race, but they seem to have mixed with some at least of the Cromagnon folk who were then living in various places in North Italy, and, as we have seen, some of them used pygmy flints. Also in Switzerland, the *lake dwellings* were, in the earliest Neolithic, inhabited by a broad-headed people who seem to be the race of Furfooz. So one gets the idea of an early Neolithic Europe with peoples arranged somewhat as follows: Azilian hunters and fishermen living on those rivers which were full of salmon, and on the seashore (Cromagnon with a dash of Neanderthal, Pygmy, and Furfooz).

Along the Mediterranean and encroaching on the Azilian tribes, a slow colonization by several succeeding tribes was proceeding—the earliest with pottery and corn, but no polished axes or domestic animals, except the dog (Campignyan); a later group with domestic animals and living in villages (Fonds de Cabane); and finally the civilized larger tribes of the latter Neolithic. All these were mainly of Mediterranean race, but catching up and becoming mixed with all the other races during their migrations. Finally centring in Switzerland, the remains

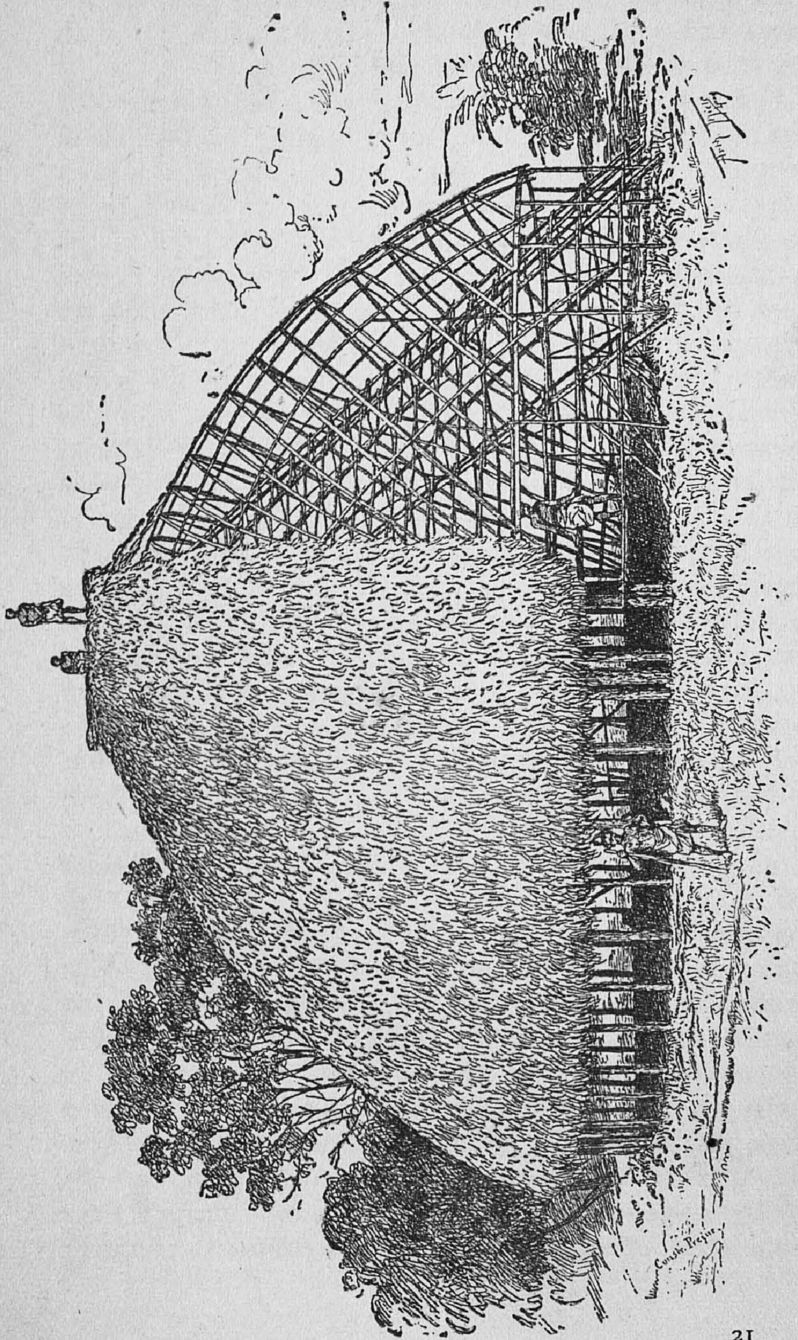


FIG. 33.—HOUSE-BUILDING IN SAMOA. (DRAWN FROM A PHOTOGRAPH.)
(Frobenius, *Childhood of Man.*)

of the race of Furfooz who had discovered how to live secure and safe in lake dwellings, but who were also, in a mild way, extending from Switzerland to the north and west, and mixing more or less with the aboriginal Cro-magnonites everywhere.

The reader will at once see that it is hopeless to try to describe the minute differences between all these various tribes and successions of industries. But for the story of prehistoric man, the really important points are to trace how what one may call the kitchen-midden civilization overspread the world. One must remember that beach-combing was generally the last resort of all unfortunates. Even to-day a tramp occasionally settles in a Scotch cave for the summer, and lives mainly on the harvest of the sea, though he also hunts the game preserved by his neighbours, and levies contributions on cottagers' wives.

We will first take the eastward route, and we come across an early stage of Neolithic in Japan; here there are double-headed clubs of stone and axes of flint and jasper. There are also obsidian lance heads (laurel leaf), stone rings, flat or curved stones for grinding seeds, and pottery marked by finger-prints.[7] There are also similar refuse heaps in the Aleutian Islands.

We have already mentioned the kitchen middens of San Francisco. The people lived on oysters, mussels, purpura, landshells, bird-bones; also on the seal, whale, and porpoise. They caught quantities of the sea otter, and occasionally killed stag, elk, beaver, and bear. They were buried in a flexed or extended position, and possessed many bone implements, and obsidian spear heads of the laurel leaf pattern.[8] In the Channel Islands of California (San Clemente), a burial, possibly of the same people, has been found. He had been tightly tied up in a sitting position, and in front, beside and over him were placed a number of flutes made of deer's leg-bone, and covered with pretty pearl fastenings.[9] Though the position and

the flute remind one of the Neolithic, we are inclined to think that this musician belonged to one of the advanced civilizations of Mexico.

In Guiana, also, Mr. Rodway points out that the first migrating tribes seem to have been in the Neolithic stage, for chipped quartz arrowheads have been found. In the regular kitchen middens there are pottery sherds of Mexican or Peruvian affinity, and human as well as animal bones.[10] Then in Chile, and especially in Terra del Fuego, there are kitchen middens dating back to a very ancient period, though some of them are quite modern. These Yahgans seem to be of very mixed origin. They are medium size (1,600 millimetres), with cephalic index of from 74·7 to 79·6, which means that they can hardly be of the ordinary American type; their brains are much below the average (1,290, 1,360, and in one case 1,550 c.c.).[11] So in this eastward distribution of the kitchen middens, there is a slight confirmation of the theory that Neolithic people from Asia did reach America.

It was only by the harvest of the sea that the first adventurers of the newer Stone period could maintain themselves in the cold and stormy unpleasantnesses of a Scotch, Baltic, or Patagonian winter. In all the places where we can trace these kitchen middens, there seems to have been a mixture of races. This is as evident in Portugal as it is in Denmark or in Japan, or in Terra del Fuego. The outcasts or refugees of people who had advanced further in civilization, seemed to have mingled with hardy low-class savages.

[1] Lethaby, *London before the Conquest*.

[2] We can find no trace of the supposed disarticulation of the bones before burial. In some cases it has been proved that the red ochre could not have been placed on the bones alone, but apparently on the body before burial.

[3] These finds are recorded by Munro, *loc. cit.*

[4] Holst (see *L'Anthropologie*, 1912) seems to rely on supposed rate of accumulation of peat; Brögger, *ibid.*, 1907.

[5] Sarauw, *L'Anthropologie*, 1905. *Bos taurus domesticus* is mentioned, but surely this is a mistake.

[6] *L'Anthropologie*, 1911, p. 334.

[7] Dumontier, *L'Anthropologie*, 1901.

[8] Nelson, *loc. cit.*

[9] Holder, *Channel Islands of California*, 1910.

[10] Rodway, *Guiana*, 1912.

[11] H. Hultkranz, *L'Anthropologie*, 1902.

CHAPTER XXII

PYGMY FLINTS

THE tiny flints known as pygmy flints (and also described by some twelve or thirteen other names[1]) were first discovered by Downing Swiney in 1864. Richard Burton seems to have been the first to call attention to these curious little tools, which he had discovered near Bethlehem. Then followed Rivett-Carnac's discoveries at Jubbulpore and those of M. Vieille in France. The whole subject has been recently monographed, first by Mortillet in 1896, and recently by M. L. Coutil (1913).[2]

The so-called "pygmy flints" are extremely minute. Some measure only $\frac{3}{16}$ inch, or even less, in size. It is, to say the least, doubtful if they are a natural group belonging to one particular industry. The shapes vary greatly, but the most usual forms are more or less geometrical. Many are triangular, and may be isosceles or scalene; others are also triangular, but with a short stem or shaft, and these are surely small arrowheads. Others, again, are very like segments, or "pigs," of an orange. In time they occur from the Aurignacian until well on into the Bronze Age. There is some doubt as to the exact way in which they were used. Many of them may have been just small hand-knives or scrapers.

It is possible that others were intended for fish-hooks, as Mr. Abbot has suggested, but the old Magdalenian hook, made of bone, is so much simpler, easier to make, and more efficient, that this is doubtful. It was suggested also that the Algerian types were useful in eating periwinkles and other shellfish. But bone pins, much more

suitable for the purpose, were discovered in the same deposits. We have, in fact, an unusually exact knowledge of the manner in which the pygmy flint man ate his periwinkle. He first broke the top of the shell, making a small circular hole, and then pushed the periwinkle out with a bone pin made for this purpose. The only specimens which are not perforated belong to a mollusc which seldom retires altogether into its shell. He seems to have eaten them raw, or perhaps roasted them on flat, thin stones, which are also found in the shell-heaps.

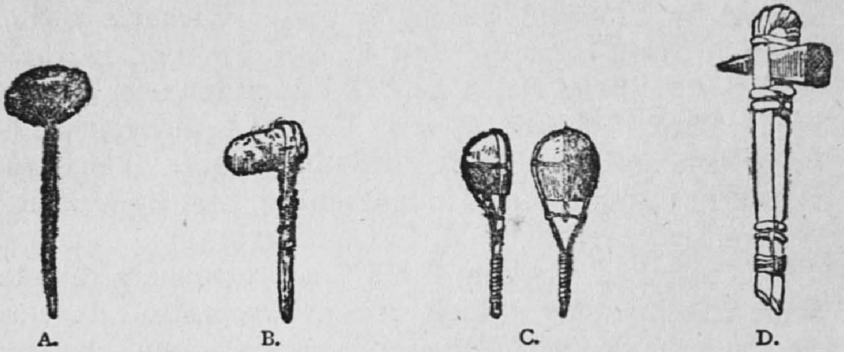


FIG. 34.

A, Stone axe, West Australia.
B, Stone axe, East Australia: South Oceanic type.
C, Stone hammer, Borneo. (After Ling Roth.)
D, Iron hammer, Katanga, Congo headwater. (Tervoeren Museum.)
(Frobenius, *Childhood of Man.*)

In most cases flints were fixed in some sort of handle and used sometimes as saws or as razors, but chiefly and especially on heavy clubs, which would inflict a horrible blow when garnished with these sharp, angular flints.

In Mexico wooden clubs of this kind, with sharp flints, fixed probably by pitch or resin, seem to have been regularly used in the temples. At Susa, De Morgan discovered flint saws stuck in wooden handles with bitumen.[3] They were probably fixed in a similar way in India, or perhaps inserted in bamboo, as suggested by Wilson.

So also in Egypt flint saws, attached with the cutting surface upwards, seem to be represented in some of the ancient Egyptian monuments. A tool of this kind, which is now in the Kircher Museum at Rome, was discovered in a peat-moss at Palada, near Brescia. Those with triangular or crescent-like head and a short stem look very like arrowheads. In later Neolithic times obvious and beautifully shaped arrowheads are extremely common.

The manufacture of these tiny and pretty little tools could only be possible when man had quite mastered the whole art and craft of working in flint. They may be taken to be the final and most exquisite result of the great industry that began with the rude and clumsy stone-breaking of the Piltdown woman, passing through the enormous coup de poing of the Chellean, the continually smaller and more exactly fashioned tools of the Moustierian, and the beautiful laurel-leaf spearheads of Solutré, until it finally culminated in the perfect arrowhead of the Neolithic and these pygmy flints. They seem for the most part to belong to the first half of the Neolithic period. At any rate, they are not characteristic of the larger villages of the dolmen builders. It is with especially the small villages or hut-circles that they are most commonly associated. They come apparently after the Azilian and the early kitchen middens, but before the dolmen time.

But they do occur in or near the dolmens, and even in settlements which belong to the Bronze Age. This, of course, is quite natural, for a flint saw or a flint-armed club would remain a very useful weapon, even when bronze was known, but still rather an expensive luxury. They are very often found in the newer kitchen middens and along sandhills by the sea or inland lakes. In England Mr. Lewis Abbott has found them especially at Castle Hill, near Hastings, Sussex, and at Sevenoaks.

In England, besides Brighton and Hastings, they have been found in Kent; at Wandsworth, in the bed

of the Thames; in Suffolk, Norfolk, Oxfordshire, and Yorkshire, but especially in Lincolnshire, where a great number have been discovered. In the West of England an interesting find is from the upper layers in Kent's cave, above the Magdalenian, and they are not uncommon on Dartmoor. They are also found in Cornwall, especially along the north coast, and at Dogmare Pool, on the Cornish moors.[4] The first record for England seems to be those discovered by Dr. Colley Marsh in the Lancashire peat-mosses, near Rochdale, and they have also been found in the Isle of Man, where they occur in sandhills, mixed with Roman pottery and money.

The Lincolnshire stations were perhaps those of most importance. No less than 200 were found in a single hollow in the sand, near Scunthorpe. There were sixty-four "scrapers," weighing less than $\frac{1}{2}$ ounce. These show an extraordinary resemblance to some of the specimens from the Vindhya Hills, in India. Some were exceedingly minute. There were, *e.g.*, crescents $\frac{6}{16}$ inch, scalene triangles, $\frac{3}{16}$ inch; round and pointed, $\frac{4}{16}$ inch; and rhomboidal, $\frac{6}{16}$ inch.[5] So far as the writer is aware, they have only been found in Scotland, at Shewalton and Loch Grennoch. In France they have been discovered in an enormous number of places.

At Rebiéres, for instance, they are said to have been found by M. Pitard in Aurignacian deposits, at Bobache in the Azilian. They were found also in the cavern of Mas d'Azil (Azilian), and in other parts of France in Magdalenian deposits. In some four or five cases, however, they occur with certain polished axes and arrowheads characteristic of the later Neolithic, and sometimes with a rude and coarse pottery.[6] They are often close to dolmens or the later Neolithic villages. Pygmy flints are common in Belgium (Remouchamps, Hastiére, Goyet, and Beauval, etc.). In Germany they are only known from Berlin, and Ofnet, in Bavaria.

It is worth noting that some of the Belgian and German

finds are Magdalenian, and occur along with the reindeer. In Spain pygmy flints have been found at Valle (Santander) and Castillo (shells or Azilian), Murcia and Almeria (Magdalenian), El Garcel (Almeria), and near Malaga. In Portugal there are the famous shell-heaps of Salvaterra and Mughem, as well as others in Estremadura and elsewhere.

In Italy the people who lived in the first hut-circles (or *fond de cabanes*) used these tiny flints, and they are also found in the *terramare;* also in Lombardy, Umbria, Florence, Tuscany, Bologna, Emilia, and also in Sicily. Extremely minute forms have been found at Baoussé Roussé, near Mentone, in the famous caves in which the negroids were discovered. In Austria the only two places noted are Rovereto Tyrol and the Theresienhöhle, near Trieste.

There are many finds in Russia — Warsaw, on the Vistula, Ossowka, and especially in the Crimea. It will be seen that there is a nearly complete line of pygmy flint stations from Gibraltar via Portugal and Santander, through France and in England, to Lincolnshire and Yorkshire by the eastern counties, and by Devonshire and Cornwall westwards. From Gibraltar they can be traced all along the North African shore to Egypt (El Loubira Constantine; Ain Sefra, Oran; near Gabez, Tunis). There is a famous station at Helouan on a terrace 33 metres above the Nile, and close to the sulphur baths. Elsewhere in Africa they have been found at Ye'limame Haut Senegal, Soudan,[7] Abyssinia,[8] and especially in South Africa, where, according to M. Péringuey,[9] they agree exactly in shape and size with those from Algiers and Egypt.

Enormous quantities of pygmy flints have been found in British India. One cave alone furnished 500 crescents, as well as nuclei, etc. Several rock shelters seem to have been workshops for their manufacture. The best-known places are the Vindhya and Kaimour Hills, Bundelkund, Banda, Jubbulpore, and near the Nerbudda.

They have also been found near Sydney in Australia by Dr. Allen Sturge.

It is very difficult to understand how they got to Australia, but elsewhere these seem to be in a nearly continuous chain (see above) of localities. Especially in Italy and North Africa it seems most probable that the pygmy flint people belonged to the Mediterranean race. In other places it is extremely likely that they were crossed with the race of Furfooz. Those of them who lived in the hut circles were probably of Mediterranean race, and had advanced very considerably in culture and well-being. In these hut-circles, or *fonds de cabanes*, the ground is excavated to a depth of 18 inches or more. Probably in warm countries, where clay was available, they made the frame of the hut of wicker-work or branches, and daubed it outside with clay.

The fire seems to have been made in the centre of the hut on a slab of clay. It is obvious that they did not want too high a wall, otherwise there is no obvious advantage in digging out a foundation. It would, of course, be infinitely more easy to make the roof with a wall only 3 feet instead of 4 feet 6 inches high.

There is a fairly close similarity in the manner in which certain Australian huts are built even in the present day. The floor space is excavated to a depth of 18 inches; the walls are made of thick branches laid against two saplings, which interlock by forked branches at the top; light bushes, tussocks of grass and mud are then used to build up the wall. These Australian huts are also roughly circular in shape.[10] But in some, at least, of the Italian hut-circles piles seem to have been driven into the ground to form the supports of the wall. It may be noted that this type of house is common in North America—at least in the Missouri district; amongst the mound-builders and Pueblo Indians, as well as on the Pacific coast north of 50°, where it joins on to the sunken earth houses of the Eskimo.[11]

These hut-circles seem to have been inhabited during periods in which there was a great change in general well-being. Of these, one of the most important was the introduction of pottery. This, of course, revolutionized every detail of an art of the first importance to mankind. Until cooking pots came into general use, there could be nothing that could be described as true cooking. Mere roasting, or a rough grill, perhaps a kind of spatchcock, would be possible; nothing more than this. The only way of boiling meat would consist in stretching a hide over a hole in the ground, filling it with water, and then heating stones red-hot in the fire and dropping them in until the water boiled. This operation sounds long and tedious, and we doubt if an Aurignacian hunter would have the patience to wait for it.

How or when the first pot was made remains exceedingly mysterious. The art of making adobe bricks is a very early one, but that of pottery is probably still more ancient. It is possible that a woman once took a basket to the riverside to bring home the fish that she hoped to catch. Laying it accidentally on the mud, the outside became plastered with slime. When the fish were taken home she may have noticed that some water remained in the basket. So she was led to experiment, and perhaps carefully plastered the inside with mud and then burnt off the basket.[12] At any rate, ever since that time the handling of pots and pans has been left to the weaker sex. In savage communities also it is she, at least in most parts of the world, who makes the pots. In some parts of the Congo one can trace to-day the origin of an ornament which is very like an early type of the prehistoric Stone and Bronze Ages. The calabash, which plays a part in it, is *not* an Old-World plant, and cannot possibly have had anything to do with the origin of European pottery. But these calabashes are now in continual use in tropical Africa, and have to be carried about. There are two ways of slinging them. One is

to attach a long cord passing over the shoulder to a sort of **Y**-shaped webbing, which passes diagonally over the bulging part of the calabash; the other is to tie a string round the slight projection at its neck.

The writer (we could find no author's name) of this paper[13] gives illustrations showing very neatly how these two methods are responsible for the ornament of the native pottery. The calabash can be made to grow into almost any shape by suitable bands tied round it when young, and the shapes are probably modelled on ancient types of pottery. Certainly the early European (Copper Age) pottery has ornaments which seem to have been derived from the same necessity of hanging up the pots. These, having at first only a rounded bottom, were not able to stand on their own feet. We think another hint of the author explains also the peculiar little knob-like handles seen on some prehistoric beakers. A string was passed through this knob and attached to a sort of rope handle fastened at the other end round the opening of the vessel. The rude drawings (Fig. 35) are perhaps sufficient to explain the matter.

Another important invention was the actual polishing of stone. Although the Neolithic period is often called the polished Stone period, there seems to have been an enormous interval in time between the Magdalenian and the characteristic Celt or polished stone axe. Stone rubbers occurred, as we have seen, in very early Palæolithic times. In Jersey both the men who lived at St. Ouen and those of St. Brelade possessed large stones worn smooth, and in all probability used for rubbing down wooden clubs or spears. It is strange that during all these ages, from Early Palæolithic to mid-Neolithic, the idea of grinding down a stone with a little water never apparently occurred to any one in Europe. The method was probably very similar to that actually seen in practice in Australia by Messrs. Spencer and Gillen.[14] The axe-maker took a diorite pebble and first roughly chipped out

the surface by hand, tapping over the whole surface for hour after hour during one or two days. Then, using a large flat block as grindstone, and with fine sand and a little water, he rubbed the axe backwards and forwards until it was complete.

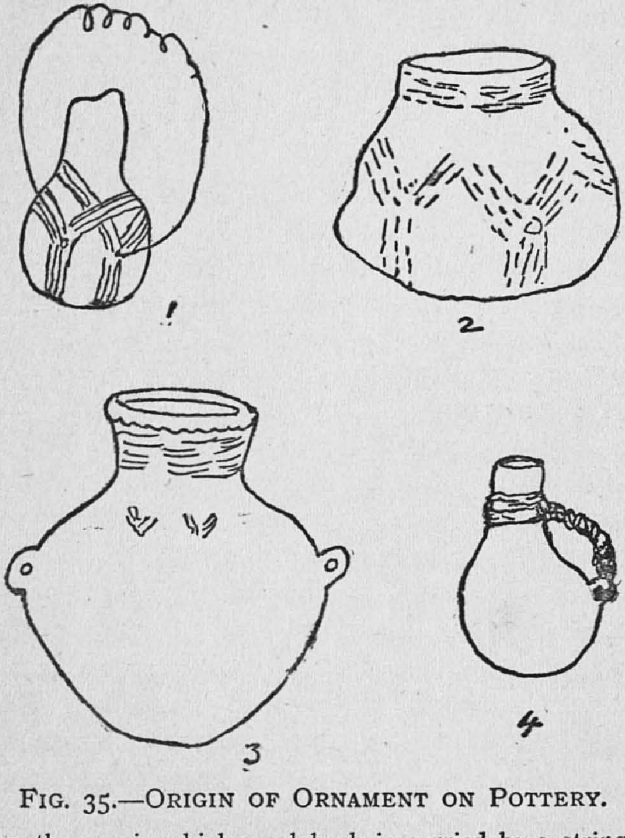


FIG. 35.—ORIGIN OF ORNAMENT ON POTTERY.

No. 1 shows the way in which a calabash is carried by a string attached to webbing arranged on the base. This is from the Congo, and is still in use.
No. 2 shows ornament on a prehistoric Austrian pot.
No. 3 is a prehistoric pot with ornament derived from the string round the mouth.
No. 4 is a modern African calabash with string handle.

It will be noted that in their description the authors point out that the sandstone block was also used for grinding grass seeds and powdering red ochre.[15] It is probable that the use of seeds as food, and perhaps the

cultivation of crops preceded the discovery of polished stone weapons, and, if so, the grinding of seeds may have had something to do with the invention.

The spotted and striped pebbles of the Cave of Azil are not the only evidence that there seems to have been something magical and mysterious to prehistoric man in stones of this kind.

According to M. Villeneuve, a small smooth stone not larger than a fifty-centime piece had been placed in the mouth of each of the negroids who were buried at Grimaldi.[16] In a Neolithic cemetery at Monte Carlo small round black or white pebbles were found with the skulls, and these, according to this author, had been probably placed in the mouth of each skull. In ancient Rome as well as in Greece (at least in 600 B.C.) an obolus was placed in the dead man's mouth in order to satisfy Charon the ferryman. One finds it difficult to believe that the negroid population of Monte Carlo were in Aurignacian times able to form any clear conception of paying one's way into Paradise. Still this is not so outrageous an hypothesis as one might think, for essentially the same idea is found in the beliefs of many savages. Amongst the Punan the ghost has to cross a river by a suspended log. On the other side sits a gigantic helmeted hornbill, which guards the way to Paradise. This bird tries by its screams to frighten the unfortunate spirit so that he will fall into the jaws of a huge fish that waits in the river below, and it must be pacified.[17] A small smooth stone is used by the prehistoric medicine man amongst many very different tribes. The following are selected because they show the wide distribution of this superstition :

The reindeer Tschuktchi in North-East Siberia have a soothsaying stone which has amongst other duties that of providing a lucky name for the children.[18] The Australian wizard pretends to suck out a stone from his patient, and gives this as the origin of the disease.[19]

Exactly the same process exists among the Melanesians, who may perhaps have had some influence on Australian superstitions.[20] Amongst the Cinghalese also a black stone is placed on the wound in cases of snake bite. It is supposed to draw the poison into itself, which is then washed off by being put in cow's milk.[21]

In the Scotch Highlands, until very recent times, magic cure-stones were common. One was called Clach Leighis, or A Bluadhag, "the little kindly powerful female subduer of pain." It was placed on the seat of pain. It was kept in the best chest in the house, rolled up carefully in a rich piece of cloth.[22] Very often these stones were dipped in water which the patient had to drink. It is at least possible that in these customs there is a relic of one of the earliest and most universal of human superstitions. Other European settlements which belong to about this period seem to show that the advance of civilization took place very slowly. Some of the villages possessed only say sheep and goats, others had cattle and horses as well. There were others where only pigs have been found. So one gets the impression of a series of villages gradually colonizing westwards and improving in civilization partly by trade, partly by increase in number. It is important to point out that up to this stage there is no actual proof of war in Europe.

[1] The following are some of these names: Tardenoisian, Captien Getulian, Ibéro-Marusian, and Intergétulo-Neolithic.

[2] Mortillet, *Rév. École Anthrop. Paris,* 1896; L. Coutil, Comptes Rendu Congrès Préhist. (Fourteenth Session), Geneva, 1913.

[3] *L'Anthropologie,* 1903.

[4] Kendall, *Man,* 1907, 53.

[5] These are compared with Indian specimens—$\frac{8}{16}$, $\frac{10}{16}$, $\frac{10}{16}$, and $\frac{8}{16}$ inch respectively (Gatty, *Man,* 1902, 15).

[6] Coutil, *loc. cit.*, gives all the departments in France in which they have been discovered.

[7] Péringuey, Trans. S. Afr. Philos. Soc., 1906, vol. xvi.

[8] *Ibid.*

[9] *Ibid.*

[10] Roth, *Man,* 1909, 27.

[11] *Cf.* Sarfert, *Arch. f. Anthrop.*, 1908-09.

[12] See, *Romance of Early British Life.*

[13] *Ann. Mus. Congo*, tome ii., f. 1, May, 1907.
[14] *Across Australia*, 1912.
[15] *Ibid.*
[16] *L'Anthropologie*, 1906.
[17] Hose and Macdougall, *loc. cit.*
[18] Bogoras, *Arch. f. Anthrop.*, 1907.
[19] Spencer and Gillen, *loc. cit.*
[20] Murray, *Papua*, 1912.
[21] Hildburgh, *Jour. Roy. Anthrop. Inst.*, January to June, 1908.
[22] Dunn, Proc. Roy. Soc. Ant. Scot., vol. i., new series; and Stewart, *ibid.*, 1888-89.

CHAPTER XXIII

THE DOLMEN TIME

As we have already pointed out, when cattle were kept and harvests grown, and which was of even more importance when man had learnt to attend to his own daily business, population began to increase with a rapidity before unknown. So all over Europe and North Africa, the forests of the lower ground, and especially those on really fertile land, began to disappear; the original forests of Greece, North Africa, of Spain, and most of the Mediterranean coast-line, seem to have been the first to vanish. Europe, if our idea of this period is correct, would be dotted over with little villages, or rather with small groups of circular huts. Each would be connected with its neighbour by a footpath winding through thickets, over rocky country, and occasionally through original forest still haunted by wolves, bears, and, in the most inaccessible intricacies of the hills, by utter savages—mere hunters such as those described at a much later period as dwelling on the Baltic about A.D. 100.

Those who have travelled in Africa beyond the regular tourist track will at once understand the conditions which seem to me to have prevailed in Europe about 7000 to 5000 B.C. The main lines of communications, no doubt, were often along the rivers, and by this time it is more than probable that dugout canoes were to be found at every recognized crossing-place. Or, in those parts where the people were of North Asiatic origin, some form of skin coracle might exist.

The same sort of Neolithic civilization probably per-

vaded all Africa from the Red Sea to the Atlantic coast, including much of the Sahara, which was then a country with grass plains here and there, and not without occasional rivers and lakes.[1] In some of these there seem to have been lake dwellings, or something closely resembling them. In Europe each village would carry on a certain amount of agriculture, and also possess a few animals. These would graze in the forest, probably under the guardianship of young men and boys armed with flint-headed arrows and bows as well as spears and clubs. Most would be expert at throwing stones or with slings. There must have been considerable variation in the different villages. Not only because some were rich and others poor, but differences in climate would inevitably bring about varying forms of agriculture, and the animals found to do best would not always be the same. Differences in race would also alter the conditions of agriculture and of pasturage. Some of these early pre-dolmen communities have been closely studied, and it is perhaps worth while to mention a few of them.

Yet we must point out that it is very difficult at present to date special little groups. At Chamblandes, *e.g.*, there is much that reminds one of the Palæolithic. The funeral customs are extremely like those of the Riss-Wurm Interglacial. The dead were buried with arms and legs closely bent so as to form as compact a bundle as possible. They were in all probability tied up with strips of leather or fibre before burial.

Several theories have been supplied to explain this peculiar position of burial. According to the first, this arrangement is copied from what was in early times supposed to be the position of an infant before birth. The dead was to enter a new world, and so was arranged in this way. A more simple explanation is that the corpse could be more easily carried to the grave, and that the grave itself would require the smallest labour in excavation. The head was painted with red or yellow ochre (as in Aurignacian

times). Sometimes a lump of ochre was placed in the right hand. The body was laid on the left side, as in sleep, with the head to the east and the face looking towards Lac Leman. A sort of tomb was made by placing one large stone over two smaller ones. This particular village seems to have consisted of keen traders for jet, coral, and especially two shells belonging to the Mediterranean, show that they exchanged with very distant places.

Two races are represented. One, the most numerous, is of Cromagnon affinity; the others are allied to the short vigorous negroids of the Grimaldi cavern.[2] At Holderness, Lincolnshire, a settlement of similar indeterminate age has been found. The inhabitants possessed cattle, sheep, goats, pigs, horses, and dogs. They had rather elaborate furniture, for they used the atlas of a whale as a seat, and possessed pottery as well as flint-knives and flakes, scrapers and stone pounders, which show, perhaps, that they cultivated corn. They occasionally killed a red deer, and were not quite destitute of human affection, for a child's plaything was discovered. Their huts were more commodious than usual, sometimes 40 feet long and 9 to 10 feet wide, but seem to have been sunk 5 feet in the boulder clay. Were it not that they seem to have had no polished stone weapons, one would suspect that they belonged to the later or dolmen time.[3] They also used red ochre.

At Perthi Chwaren, in Wales, the people had nearly the same animals—cattle, horse, goats, pigs, as well as the dog, which was used for food. They also ate red deer, roe deer, badger, hares, rabbits, and water-rats. They had pottery. Here also they were buried in a contracted position. This community seemed to have lived in a cave, and they had built a wall across the mouth at some little distance inside. They may have been refugees belonging to the time when the first Celtic invasions took place. At any rate they had polished stone axes.[4]

In Ireland a people with almost the same animals lived in the caves of County Clare. Their sheep belonged to the St. Kilda variety; they also had goats, small cattle (said to be like Kerry cows), horses the size of a Connemara pony, and dogs. It is impossible to give any date to them, for Neolithic and other remains are mixed up.[5] In Baden (Kleinkems), and at Sierentz, Upper Alsace, Neolithic settlements have been described. Here also the people possessed cattle of the same or similar type—sheep or goats, swine, and horses. They also killed red deer, and had a very coarse pottery.[6] One skull, examined by Kollmann, seems to have been of the Furfooz type, and this district is clearly within the sphere of influence of the early lake dwellings. These early Swiss lake dwellings were at first inhabited by the race of Furfooz (Brachycephalic). They possessed all the domestic animals, and grew two varieties of wheat as well as barley, peas, vines, etc. But lake dwellings are of all ages, and it is unlikely that the earliest of these villages had looms, pottery, baskets, needles of bone, buttons, and combs, etc. They have been also so fully described by Munro, Keller, and other authorities that we shall not discuss them. The important point is that they seem to have existed through this Neolithic period, and must have influenced their neighbours.

Whilst Europe as a whole was covered with a network of small villages, the less advanced peoples were being forced farther and farther towards the north and to the extreme east. The dunes at Oka, the southern shore of Lake Ladoga, Finland, Archangel, the Urals and the Kama basin were already inhabited in the Neolithic. In Europe, at any rate, there were settlements from the Black Sea in the south to the White Sea in the north, as well as to Ireland and Oronsay.[7] This, of course, means that red deer and other wild animals had diminished seriously in numbers.

It seems to us probable that a large proportion of the

Cromagnon race had begun to live in villages, and were obtaining animals and perhaps corn from either the lake-dwelling people centring in Switzerland, or from the dolmen folk, who were by this time colonizing all along the coast-line as well as into the valley of the Rhone. Their track is quite clearly and definitely traced by the megalithic buildings of one type or another, which follow in a series almost unbroken from Egypt, by Tripoli, Algeria, Morocco, Spain, Portugal, Western France, Southern and Western England, to Wales and Ireland (see below). But they also seem to have reached Western Germany, Denmark, and Southern Scandinavia. In later times direct trade routes existed from the Adriatic and across Germany to the Baltic, and from about Marseilles, across France by the Rhone and Loire to Brittany.[8] But one gets the impression of a Europe at this time, in which paths through the woods ran in every direction, and when some article made in Italy could find its way from village to village to Southern Sweden, or to Kiev, or to Scotland.

Not many years ago Manchester or Birmingham goods were traded almost to the very centre of the African Continent by inter-village barter of exactly the same kind. But, though characteristic pottery and weapons may have been distributed in this way, the passion for monumental masonry seeems to have been an idiosyncrasy of the Mediterranean race. Some authors believe that every primitive race passed through a stage of civilization in which they erected monuments of large stones.[9]

But, as we have shown, there is no very distinct break in the chain of great stone monuments from Peru and Mexico via Japan, Java, and India, to Mesopotamia. They are also to be found in the South Sea Islands as in the lonely Easter Island, and there are large blac monoliths in Pitcairn Island. If there is any proof of a common race element existing all along the track

of monumental masonry, it is quite unnecessary to suppose that the passion for this amusement is an inevitable growing sickness (so to speak) of humanity. Such evidence exists, for, as we have seen, Sergi finds the same Mediterranean race as an element in the Polynesian. He also believes that it exists in America, but, as we tried to show, those who brought this custom were probably but few in numbers.[10] Amongst others who have supported this theory are Macmillan Brown.[11]

It would be absurd to expect precise similarity in places so widely distant. Variations would naturally arise almost in every centre. But the underlying idea was to commemorate something or someone by a huge stone, the bigger the better. It is only unfortunate that they forgot that, though the stone itself did remain (as they hoped) for untold generations, the memory of the event, even the name of the race who set it up, has vanished away. This underlying idea seems to prevail throughout the whole range of megalithic monuments. It seems to be still carried out by the Naga tribes of Manipur, who not only put up stone circles, but apparently also made barrows in honour of distinguished persons.[12] Someone who had once been in Spain told Aristotle that the Iberians set up an upright stone for every man that a dead chief had slain.

The simple circle of great blocks of stone is apparently found in North America, India, Austria, Germany, Sweden, France, England, Scotland, and Ireland.[13] There are thirty-nine such circles near Inverness and twenty-five near Nairn, of which three are concentric.[14]

The simplest type of dolmen is almost, or quite, as widely distributed, but these are but two of the most rudimentary forms of megalithic monuments. Sometimes the dolmen is covered with a mound; there are also such types as the *allée couverte*, "horned" cairns of Scotland, and Nuraghi of Sardinia. A very curious and peculiar shape is found in Japan, where all the dolmens seem to be covered with earth. In America the zone of

civilization appears to be everywhere marked by buildings of huge stones. The types hardly seem to be classified as yet, but the extraordinary skill in mason-work has been remarked by every observer. There is, for instance, one famous stone, with twelve sides, cut in such a way that it mortises into the surrounding blocks.[15] There is the same profuse expenditure of labour in the exquisite fitting and quite unnecessary cutting out of the blocks.

Both the origin and the beliefs associated with the huge monuments of Mexico and Peru are not known. But they were surely in details different from those prevalent in Europe and Asia, though, as we think, derived from the same common origin. Even in Africa there seems to be a departure from the usual type. In the Gambia there are circular tumuli or cairns, with two or three upright monoliths, placed not as elsewhere, leading towards the centre of the cairn, or more or less parallel to a diameter, but parallel to a tangent to the circle.[16] Captain Maxwell Carroll found, however, regular stone circles at Chamen, near Lamin Koto on the Upper Gambia.[17]

It is impossible to describe these differences without more space than we can afford, but they all seem to be variations of, and embellishments on, what was no doubt a simple original idea.

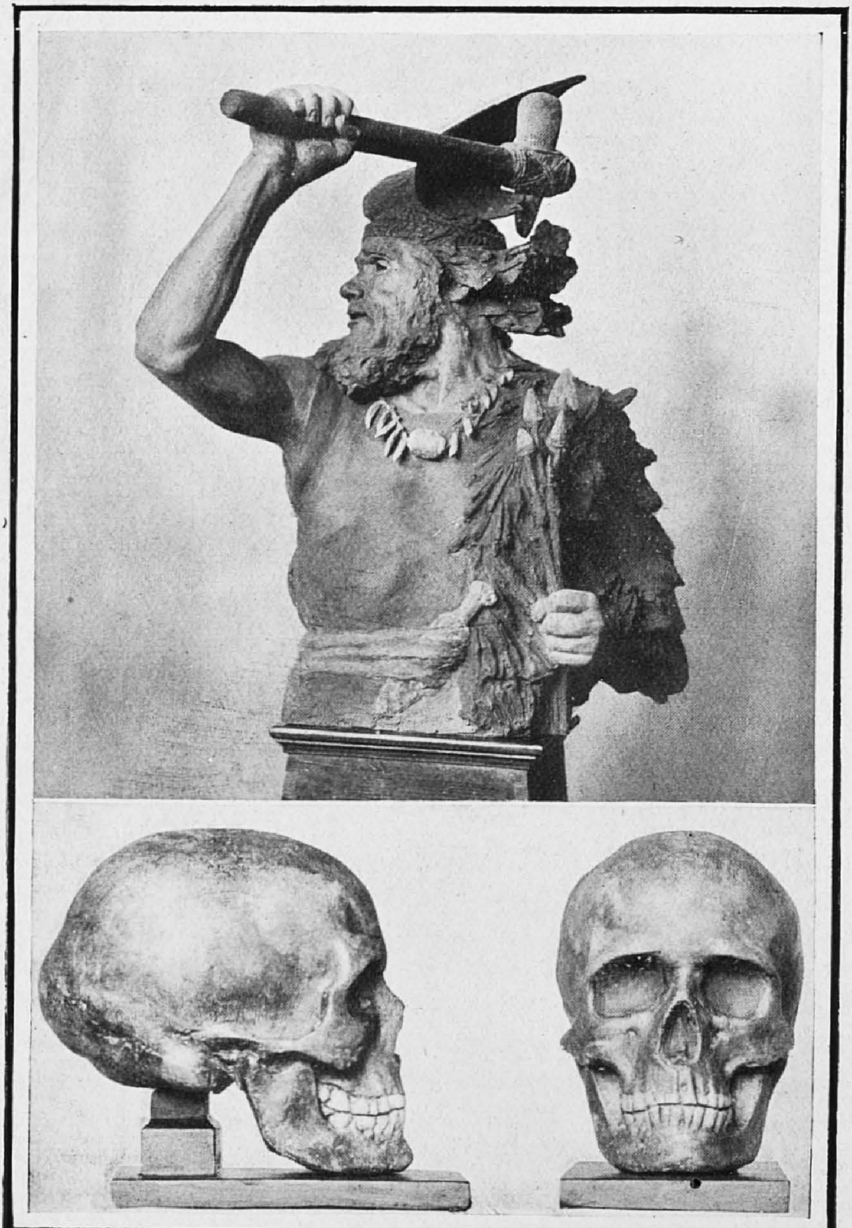
There is something extremely attractive in a suggestion by Evans that the very first beginning may be found in the mound hut.[18] The entrance passage would correspond to the "honorific avenue" of standing stones. The circle of stones might be compared to the outer ring supporting the mound, or it might be to the piles (see p. 330), forming the foundation of the wall. The great stone supported by two others would correspond to the stone doorway. So it might be that the central idea from which all those variations arose was that of a house for the dead, imagined according to their own ideas of what a house should be, but magnified and made of stone, so

as to be imperishable. But this would be altered and applied in unintelligible ways and inconsistently when the ruling class wished to commemorate a wealthy potentate in some new and original way.

It is, at any rate, true that all these monuments, with rare exceptions, are permutations and combinations of three elements—the dolmen, a line or circle of standing stones, and a stone chamber or box. It is perhaps worth noting that Dr. Sarrasin believes that the original Greek temple was modelled on a rectangular lake-dwelling house. The piles are represented by the pillars, and even the original caryatides can be found in the rudely carved wooden posts occasionally discovered in lake dwellings.[19]

In the case of the megalithic monuments, the original would be a circular hut, with, as suggested above, a stone gateway and an entrance passage. It is worth noting also that the concentric circle, with a groove leading to the centre, is almost exactly a ground-plan of many megalithic monuments. But in monuments of the more advanced tribes there is distinct evidence that they became temples, at which the sun was worshipped, and which prove, if the argument is sound, that the people concerned had a very fair knowledge of practical astronomy. In the year 1680 B.C., on Midsummer Day, standing in the midst of the great curve of the trilithons at Stonehenge at a point which is marked by an aperture between the two piers of the central and greatest stone, the sun would rise over the summit of the boulder called the "Friar's Heel."[20] So also in Japan the rising sun was worshipped, and was observed between two great natural rocks over a wooden trilithon placed behind the altar.

According to Captain Boyle Somerville, the imposing group of forty-eight standing stones at Callanish, Lewis (Hebrides), may be analyzed into four lines of menhirs and a "circle" of thirteen. Two of these lines are east to west and north to south respectively. A third line, the most important, seems to mark the rising of the star



A MAN OF THE LATE NEOLITHIC PERIOD

Restored according to the directions of Professor Rutot of Brussels

Capella (of the first magnitude) about 1800 B.C.[21] A fourth line might have been based on the rising of the Pleiades in 1750 B.C.

Capella, in 1800 B.C., would rise just before sunrise at the winter solstice. It might also have "warned" the rising of the full moon every nineteen years, which is the basis of the metonic cycle of ancient Greece. So this star might have been used for both solar and lunar worship. Nor are Stonehenge, Callanish, and St. Kilda, the only cases in which it has been shown that monuments of the megalithic age or dolmen time were built and oriented by a people accustomed to study and observe the stars. In Japan the dolmens are carefully oriented, but not always apparently quite correctly. In the Mexican-Peruvian zone of civilization there seems to have been an excessively complex astrological science based on a calendar of twenty years. Moreover, in many other European monuments it has been found that conspicuous boulders on a far-off hillside or a gap in the hills have apparently been utilized as a "foresight" for such observations.

But as many authorities refuse to admit that there is any definite orientation in these monuments, let us see what are the probabilities for the truth of these dates.

In Egypt, as early as 4600 B.C., the tomb of Nefermaat had lofty passages roofed with stone beams, some of which weighed forty tons.[22] This shows that at that date—at any rate, in Egypt—the art of monumental masonry had arrived at such a pitch of perfection that any kind of known dolmen could have been erected there. Now, there is much ground for supposing that the first and perhaps the most destructive of all the series of invasions of Southern Europe by the Celtic people took place in 1700 B.C. After these invasions, it is in the highest degree improbable that elaborate stone monuments would ever be erected—at least, in any country through which the northerners had passed.

Stonehenge is the most elaborate, perhaps, of all European

monuments of the dolmen time. It was in all probability built at the flourishing period of the Neolithic civilization, just before it was wiped out and destroyed by the barbarians of the north. Such a date as 1680 B.C. is almost as probable a one as could be selected. Callanish is much farther to the north, and one would hardly have expected so early a period, but there is nothing improbable in the date given—viz., 1800 B.C.

Some authorities believe that all these megalithic monuments are graves and not temples. No doubt many of them are the burial-places of some great chieftain, but it is certainly not fair to assume that because some are graves, none are temples. The King may have been looked upon as a son of the sun, and his tomb built on the lines of a sacred temple.[23]

On the whole, the date of Stonehenge obtained in this way may be considered the first fixed point of a whole system of monuments, and is, in consequence, of the greatest possible value. The people who could handle huge blocks of stone, calculate the periods of the moon and star, and form terraces for irrigation from Devonshire to Abyssinia, were undoubtedly civilized, and in all probability far more so than the Gauls and Celts who destroyed them.

Yet it is doubtful if the dolmen builders possessed many engineering appliances. In Egypt heavy blocks were transported on sledges or by water. In Japan, during the seventeenth century, the castle of Osaka was built on megalithic lines. One stone in it weighed 160 tons, and was carried on rude wheels or rollers of wood, and dragged by a great number of men. Such operations involve not only the feeding and supply of at least 2,000 men (or a population of 10,000) in one place, but a very considerable organizing power, facilities of trade, carriage of provisions, and so forth. They had, in fact, oxen, sheep, goats, horses, pigs, and also obtained both deer and rabbits.

At Salabé, near Rivadeo, in Spain, there is said to be a cutting intended for irrigation which involved the excavation of some 4,000,000 cubic metres.[24]

There was also an extraordinary development of mining, especially at Grand Pressigny and Spiennes in Belgium, as well as at Grime's Graves and other places in England.

At Spiennes there are both galleries driven in from the valley sides, and also circular shafts, which had to be sunk through 9½ metres of gravel, greensand, and chalk, until they reached the particular layer of flint nodules which they wanted. From the base of one of these shafts (3 feet in diameter) they worked outwards, the sole being the layer of good flints. They used rough lamps made of chalk hollowed out and filled with grease. All their excavation was done with a pick of deer-horn. They severed the cup end, and removed the "bez" and "trez" tines, using the brow tine as a pick. Accidents must have been common. In the Brussels Museum one can see the skeleton of a miner who had been killed when cutting such a gallery; he had broken into a pocket of sand, and had been suffocated.

At Salzburg, in Austria, the Neolithics mined salt, and they also worked the turquoise mines in Egypt. All or most of this mining was being carried on when even copper was only known as a rare and precious ornament.

The flints mined at Pressigny and Spiennes were distributed over a very great distance, even to Morbihan, in Brittany, to Alsace and Savoy, as well as to the Pas-de-Calais and Western Belgium. This involves an organized community of an advanced type far beyond that of any negro or Red Indian tribe.

Most of these later Neolithics seem to have belonged to the Mediterranean race, such as both the Iberi and Ligures, who in classical times penetrated into Spain and Italy from the Straits of Gibraltar. Other invading colonies of the same Mediterranean stock reached South Italy, the islands

of Sardinia, Sicily, Crete, and others in the Ægean by sea, probably from Asia Minor.

But in our own islands, and in Northern and Western Europe, the typical Mediterranean race seems to have been mixed up both with the Cromagnon people and with the short-headed race of Furfooz (lake dwellers). The miner at Spiennes—whose death by accident is mentioned above—was certainly more or less brachycephalic.

Professor Elliot Smith remarks that these Neolithics, of some 4,000 years ago, if dressed as we are, would pass unnoticed amongst us. This, of course, is not in the least surprising, for the modern European is, on the view which we have adopted here, just a mixture in varying proportions of the three types—Cromagnon, Furfooz (with later brachycephalic introductions), and Mediterranean.

One curious fact is that they seemed in Western Europe to have almost given up all artistic work. It is true that one does find here and there rough stone monoliths rudely carved into a vague head with folded arms and other ornament. Many of these rude statues have been figured and described by the Abbé Hermet. A curious fringe-like arrangement hanging down on each side of the body in front seems suspiciously like some early form of stole. It is a fact that a large rude cross is sometimes carved on standing stones—at least, in Scotland. Some of these rude figures and the crosses may have been carved by earnest Christian missionaries who wished to divert the people from continuing their ancient superstitious practises. Offerings are still made on large stones in Nubia.[25] Although this is a Mohammedan district, Mr. Blackman found rags, buttons, etc., tied to a wire ring in a large stone at Dabôd. Sacrifices were also made on a block near the tomb of Sheikh Abd-er-Rahim.

M. Cartailhac regards as of the later Neolithic period (second half) certain rude figures carved on granite rocks, and also such letters as U, E, W, X, ϖ, ♁, and others. The letters are of very special interest, for they might be

taken to be part of the early sign alphabet, which, as we have seen, was apparently common to the whole Mediterranean Neolithic nation.

As regards even their burial customs, it is very difficult to say anything definite. In Italy and elsewhere the use of red ochre or oligiste seems to have continued well on into Ligurian times. The body was buried, sometimes extended, or more usually in a more or less contracted position. It is probable that they used stamps ("pintaderas") of terra-cotta, which were rubbed in a mixture of red ochre and then pressed upon the skin, by way of ornament.[26] They may have tattooed their bodies, but there is no proof of it.

The abundance of loom weights, of bone combs and pins, and especially of pottery, seem to show that even the forerunners of the dolmen builders were civilized, and especially that they were an industrious and well-domesticated folk. That is the really important point, for without a civilized proletariat no advance could ever have been made beyond the artistic savage culture of the Magdalenian. But a people of this kind form a temptation to the clever and unscrupulous.

Before the great barbarian invasions, these Neolithic culture-centres had already become the seat of horrible and savagely cruel superstitions. It was not only in Crete that youths and girls were sacrificed. Every year seems to have seen, at any rate, one human sacrifice at the sowing of the corn, and very possibly two others—one at the new year and one in harvest-time. In Mexico, and probably also in Peru, the same development occurred. It is not part of our task to trace the origin of these cruel rites in Egypt, Crete, Assyria, etc. But it seems that a spiritless, humble-minded, and hard-working folk were, everywhere in Europe, hardly exploited for the benefit of their chiefs. Where great wealth accumulated, then such palaces as those of Crete, or such works as Stonehenge, could be erected.

The whole civilization of the dolmen builders, the very name of them, their language, their customs, except a very few, which can rather be divined than proved, fell to pieces at once, and vanished for ever as soon as the northern race had learnt its power and started on a career of conquest and of destruction.

[1] Desplagnes, *L'Anthropologie*, 1906.

[2] Schenck, *L'Anthropologie*, 1905; also Naef, *L'Anthropologie*, 1901, p. 269.

[3] Greenwell and Gatty, *Man*, 1910, 48.

[4] Boyd Dawkins, *Cave-Hunting*.

[5] Scharff, Usher, and Cole, Trans. Roy. Irish Acad., vol. xxxii., sect. B, part i.

[6] Mieg, *Arch. f. Anthrop.*, 1906.

[7] Anoutchine and Déchelette, *L'Anthropologie*, 1904.

[8] Montelius, *Arch. f. Anthrop.*, 1900; Siret, *L'Anthropologie*, 1908.

[9] Lewis, *Jour. Roy. Anthrop. Inst.*, 1908.

[0] *Man*, 1907, 85; see also Elliot Smith, British Association, 1912 (*Times*, September 10). We have only seen the meagre report in this paper, but gather that Elliot Smith does not believe that every race made dolmens at one period of its history.

[11] *Maori and Polynesian*, 1907.

[12] Hodson, *Naga Tribes of Manipur*.

[13] Rau, Dept. U.S. Geog. and Geol. Surv. (contributions North American Ethn.), vol. v.

[14] Fraser, Proc. Soc. Ant. Scot., 1883-84.

[15] Bryce, *South America*, 1912; Markham, *loc. cit.*

[16] Duchemin, *L'Anthropologie*, 1905.

[17] *Geog. Jour.*, November, 1898.

[18] Evans, *Man*, 1902, 16.

[19] Sarrasin, *L'Anthropologie*, 1907.

[20] Lockyer and Bemrose, *Nature*, 1901-02; also Gowland, *Archæologia*, vol. lviii., part i.

[21] *Jour. Roy. Anthrop. Inst.*, January-June, 1912.

[22] Petrie, *Man*, 1910, 79.

[23] There is a spirited debate on this point in *Zeit. f. Ethn.*, 1911, to which the reader is referred.

[24] Cartailhac, *Le Préhistorique en Espagne*.

[25] Blackman, *Man*, 1910, 11.

[26] *Cf.* Peet, *loc. cit.*; also Colini, *L'Anthropologie*, 1905.

CHAPTER XXIV

PREHISTORIC TRADE

Not a single one amongst all the primitive races of man can be said to be entirely without some system of trade or barter. It is, perhaps, probable that in the very earliest times the Piltdown folk and the Neanderthalers carried on no kind of exchange, chiefly because, first, there was nobody within reach, and, secondly, because they had nothing to share, not even a moment of their time, all of which was required to catch their daily game. Such a state is conceivable, but it is more or less hypothetical. It would be difficult to prove that it ever, but yet it may have, existed. But in Aurignacian times man had risen out of this almost animal condition; in the graves of this period there is an abundance of weapons, and, not only so, but of ornaments.

It is also obvious from the engravings and paintings of Aurignacian and Magdalenian date, that they had leisure, and were not obliged to hunt all day and sleep all night. Even the solitary hunting family had necessarily to know its neighbours *more or less.* No doubt each kept itself strictly to itself; but the young men required wives, and this involved some sort of distant acquaintance with neighbouring families. It may be that it was by the intercourse of women that the savage and *farouche* attitude of the hypothetical first solitary hunter was broken down. The customs regarding the avoidance of a mother-in-law are so ancient and so widely distributed that some inconvenience seems to have been experienced through her visits even at a very remote period.

However, all this is pure speculation, for there is proof of trade relations of a kind amongst the Magdalenians, if not earlier. At the cave of Napoleon's Kopf, near Niedernau, a Mediterranean shell, pierced and used as an ornament, was discovered in deposits of Magdalenian age.[1]

So also in the Grotto of Lacave, which is some fifty kilometres to the east of the nest of stations of Palæolithic age in the valley of the Vézère, five shells were discovered.

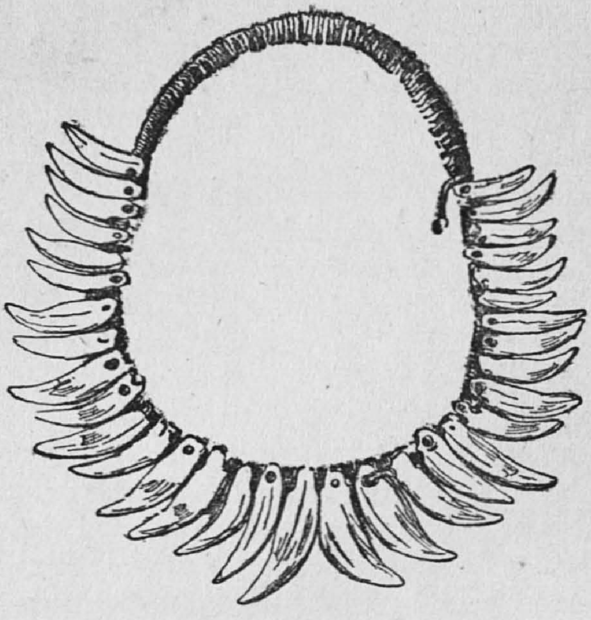


Fig. 36.—Leopard-Teeth Ornament of the Balolo within the Great Congo Bend. (In the Possession of Dr. Brandt.)
(Frobenius, *Childhood of Man*.)

Two belong to the Atlantic, and three to the Mediterranean.[2] Commerce in shells continued into the Early Neolithic, for at Chamblandes (Vaud), Mediterranean shells have been found in the Early Neolithic refuse. These also are pierced for suspension, and are clearly ornaments.[3] So at this ancient and early date man was not only fond of adorning himself, but occasionally exchanged goods. It is very unlikely that in any of these

three cases the owner of the shell travelled to the seashore for it. It is almost certain that it was passed, by some sort of barter, from owner to owner to almost the centre of Europe.

Many other cases could be quoted to show that the Magdalenians were able to obtain foreign goods somehow.

Personal property exists amongst savage nations everywhere in the world. We very much doubt whether there ever was a community of property in savage times. First, because there was no community—only a very small tribe of three or four families; and, secondly, because even animals, such as dogs and chimpanzees, have an idea that certain articles belong to them.

Even in Africa and amongst the Veddahs, before they became more or less altered by contact with civilization, neither land nor anything else was held in common. Before land was cultivated it is probable, from what we know of early hunting peoples, that each family had its own game preserve; trespass in pursuit of game was an act of war. On the other hand, what was worth nothing would be offered freely to any stranger.

It seems probable that the first trade arose through the obvious advantage of giving that you may receive. If one small group of hunters killed an animal, they would be well advised in offering what they did not want to the next group; this would be done in the hope of favours to come. People with a brain of 1,500 c.c. capacity could hardly be so foolish as not to see the advantage of such a system. In seasons of scarcity or famine, Eskimos will resort to another tribe, and it is said that food is never refused.

When there was cause for suspicion—that is, in dealing with a powerful enemy more numerous and better armed than themselves—it may be that silent trade was carried on. So in much later days than those which we are discussing here, no savage community would hold open truck with, *e.g.*, Malays, Carthaginians, or Arabs. They

would especially hide their women, just as the Tapiro refused to allow Captain Rawlings's party to see any women.

As we have seen, barter or exchange may have been in existence as early as the Aurignacian, and was certainly carried on in Magdalenian time.

From the interesting cases brought together by Sir Philip Grierson and Mr. Ling Roth, there seems a probability that at first the idea of trade was simply an exchange of presents; at any rate, this was the Andamanese notion of it; amongst negroes also the "present" idea still prevails.[4]

Whilst still on this very primitive level of mere exchange, quite complicated transactions are possible. So in Australia, a piece of Pituri wood may be bought on credit at Carlo, near Merion downs, and paid for in due course of time by shell ornaments brought from Normanton in the Gulf of Carpentaria.

An interesting point in Mr. Ling Roth's[5] account of these transactions is the use of a message stick. The buyer's emissary carries this ornament, and the seller examines it. When payment is made, the same stick must be exhibited, and the account is considered closed.

In South America there is an even more complicated system. Hunting dogs are bred for sale by a tribe called the Woyowais; these exchange the dogs for boats with the next village to the north (Wapianas). The boat-builders exchange them for urali poison with the next village (Macusis), who pass them on to the most northerly point, a settlement of true Caribs, who give a special sort of river-clay and pottery in exchange for the hunting dogs. Such simple exchange is the general rule amongst savage nations in almost every part of the world. As a rule, it is not considered wrong to cheat, *if you can;* but even amongst the simplest of savages, it is not very easy to do so. But when a more powerful or better-armed people carries on trade with a lower-scale tribe, there is always a

possibility of robbery with violence. This has often led to the silent trade, described in an extraordinarily interesting manner by Sir Philip Grierson.[6] So many examples are given in this book that further detail is unnecessary.

Herodotus (400 B.C.) states that the Carthaginians carried on a trade with the Libyans, exchanging gold for wares. Both parties laid their goods on the beach or in selected places, and buyer and seller never even saw one another. So also even to-day the Awatwa, a fishing people who live in the Lukanga swamp, lay their fish on the river bank. Neighbouring natives bring corn and take away the fish.

These Awatwa are apparently afraid of the Arab slave-trader, who used to be extremely prevalent in this part of Africa. This is shown by their choosing to live in an extremely uncomfortable way. Their huts are almost pile-dwellings, and only raised about a foot above the level of the water, with a slab of clay as hearth.[7]

In most cases where silent trade is or was carried on, it seems to us that either Arabs, Carthaginians, or people of that nature are responsible for it. As soon as slaves became a regular article of commerce, it would obviously be sound policy for the Libyan not to appear in person. But until there were lands to cultivate or flints to be mined, there can hardly have been any great demand for slaves. So this interesting custom does not seem to us to be so ancient as the ordinary exchange of goods. This can go on between two tribes who are at open war with one another. Between the fights, women pass between the villages exchanging goods.

In the Malaitas (Solomon Islands), the men of each party, armed with spears or rifles, keep guard afar off, whilst the women of the one side bring their yams to exchange with fish brought by the women of their enemies.[8]

So also in 1831 the Landers describe a curious incident on the way down the Niger. The party which they were

accompanying were at war with a village on the river bank. Nevertheless, they landed to buy provisions. A row of yams was arranged in line; the villagers, well armed stood on one side, whilst the canoemen, with muskets, swords, and spears, were placed on the other. An old woman took charge of the bargaining, and managed the exchange for both. So, in spite of a condition of strained relations, or even in war time, trade and commerce are still possible.

Amongst the different villages of one people, it is exceedingly probable, as Mr. Ling Roth suggests, that religious festivals may have been the first markets. He shows how the Andamanese, American Indians, and Australians prepare for a festival by getting ready anything that they can dispose of. Such festivals seem to have been common in the dolmen time, and were, no doubt, fairs also.[9]

The three essentials for savage life were, in prehistoric days, food, weapons, and ornaments.

Starvation may have had a great influence in forcing shy and fierce savages to enter into commercial relations with much more advanced peoples.

But the earliest commerce of which we have definite evidence is one in ornaments or pretty things—namely, shells. These shells, chiefly Cypræa species, were common articles of trade at a very early date; besides, as we have seen, being in use in Palæolithic and Early Neolithic times, Cypræas of the Indian Ocean occur at about 2000 B.C. in the east half of the Mediterranean. In 700 B.C. they have been found in Cyprus, Carthage, Syracuse, Bologna, and Bosnia, and were probably used even in the third La Téne period.[10] At first they were clearly ornaments; but it is quite possible that shells (especially the cowry) were the very first of all moneys. Even in America the "wampum" originally was nothing but a row of shells used in barter. In almost all parts of Polynesia, in the Malayan region, in Africa, both East

and Central, and in India, shell money seems to have been the very first of all currencies.

If we suppose that shells were the first ornaments and were first used as trade units by the original Caucasic (or Mediterranean) stock, this distribution is just what would be expected.

Other ornaments which have had a great share in opening up new lines of commerce are beads, jade, glass, amber, and pottery. Glass, of which the oldest known record seems to be in Egypt about 4000 B.C., has been found at various dates in Scandinavia, Britain, the Gold Coast of Africa, as well as in India.[11] Beads of black or opaque and dark brown glass were common in the Bronze Age (the period of swords of bronze and iron) from North Germany to Italy.[12]

The trade in amber was one of the most important in prehistoric times. It was supposed that this strange material consisted of the tears shed by the sisters of Phæthon at his untimely death. In the days of Odysseus it was brought from the North Adriatic and distributed through the Mediterranean, and it was a common ornament in Italy in the Terramare times. To obtain it, traders must have passed right across savage Europe to the very shores of the Baltic. So also in South America, quartz crystals pass in trade along the whole length of the Amazons.[13]

Strange that pretty ornaments intended to please the women of Crete and other civilized communities of the Mediterranean should have had such remarkable effects in forming highways throughout the length and breadth of savage Europe!

We should perhaps give here some of the more important of these trade routes, for they throw a great deal of light not only on trade, but on the invasions of the northern barbarians which were to alter the whole course of European history.

From Italy to the north the most important road seems

to have been that by the Brenner Pass. This route from Verona follows the Adige or Etsch and the Eisach valleys, so leading to Innsbruck. This river may have been followed to Linz or Passau.

A prehistoric commercial traveller at Linz or Passau would be within easy reach of such places as Hallstatt or Salzburg. He could also pass either up or down the Danube; if he went up to Donaueschingen he could, from thence, reach Schaffhausen and go down the Rhine Valley or on into France by the historic pass of Belfort. But if he wished to go north, he would travel from Linz or Passau to some of the tributaries of the Elbe or Vistula, by which there was an easy road to the Baltic and the amber ports. There were two other routes also of some importance. One of them was by Venice to Trieste, and on to Graz and Pressburg. The other, by Chiavenna, led directly to the Valley of the Rhine, either over the Splügen Pass or round by the Bregaglia, and over the Julier or Albula Passes towards Reichenau and Chur.

Between Lake Como and the valley of the Rhone, there does not seem to have been any recognized highway into Switzerland. But a traveller going to England from the Mediterranean had three different routes open to him. He could pass by one of those already mentioned down the Rhine, which seems to have been densely inhabited (according to prehistoric standards), or down the Elbe, and thence take ship for Yorkshire or Northumberland. Or, if coming from the Mediterranean, he might make his way up the valley of the Rhone and Saône, thence down the Loire into Brittany. This route was well known about 300 B.C., being that apparently followed by the Grecian traders. The older route by which the dolmen folk seems to have migrated was by North Africa to Gibraltar and Spain, thence probably by Santander and Western France to Brittany, and so by Havre, Dieppe, or possibly Calais to England.

In the Bronze Age many of the higher Alpine passes were in continual use. A bronze pin was found on the Duxerjoch (2,336 metres).[14] A sword has also been found on the Brenner Pass. In Germany, Austria, and France, during the Neolithic and Early Bronze periods, the trader would probably travel from village to village carrying with him ornaments, pottery, and especially weapons, and bringing back slaves, amber, and perhaps salt. Along the Mediterranean the Sidonians seem to have had factories (very like in principle to those of Surat and other parts of British India in early days) from about 2000 B.C., and carried on a great trade with Spain.

Later they were expelled from that country by the Celtic invasions of 1300 to 1200 B.C. Marseilles was founded about 600 B.C., and about this period Greek factories replaced those of the Sidonians.

So in Europe, in Neolithic times, the coast-line would be known in a rough sort of way by the civilized people of Sidon, Tyre, Crete, Egypt, and Greece. Inland, adventurous and illiterate traders may have wandered over a large part of the continent distributing arms, beads, pottery, and the like. There was no doubt some squabbling between the various villages and piratical inroads, but there is no sign of serious war until bronze was in common use.

Yet from the beginning to the end of the Neolithic period there had been an enormous advance. The forest had shrunk considerably; cattle and corn had increased enormously. The population had also increased. In Inverness-shire alone there are thirty-nine stone circles. We doubt if any one of these could have been erected by a village of less than 5,000 inhabitants, so that even in this county there might have been 195,000 people.

Moreover geography was becoming known; commercial travellers would tell interesting stories of the great cities of the South and East, especially of their wealth, vice, and corruption.

[1] Schmidt, *Arch. f. Anthrop.*, 1908-09.
[2] Viré, *L'Anthropologie*, 1905.
[3] Naef, *L'Anthropologie*, 1901, p. 269.
[4] Grierson, *Silent Trade*, 1903.
[5] Ling Roth, *Trading in Early Days*, 1908.
[6] Grierson, *Silent Trade*, 1903.
[7] Moubray, *In South Central Africa*, 1912.
[8] Woodford, *Man*, 1908, 43.
[9] But we think Mr. Ling Roth is a little hard on the overlord, whose permission was necessary for a market to be held. The conditions of life in those days were such that the people could not exist unless under the protection of an overlord. He was responsible for all law and order, and naturally his permission was necessary. We do not believe that there was any usurpation of the rights of the people (*cf.* Ling Roth, *loc. cit.*).
[10] Reineke, *Arch. f. Anthrop. Korr. Blatt.*, 1904.
[11] Kisa, *Das Glas im Altherthum*, 1908.
[12] Déchelette, *L'Anthropologie*, 1905.
[13] Spruce, *Notes of a Botanist*, 1908.
[14] Weber, *L'Anthropologie*, 1905; Montelius, *Arch. f. Anthrop.*, 1900; Dawkins, *Nature*, November 14, 1901.

CHAPTER XXV

THE AGE OF METALS

JUST as with so many other great inventions, a trivial accident seems to have led to the discovery of the first useful metal.

The hearths of Neolithic folk were usually slabs of clay, and probably by pure chance a lump of copper ore was thrown into a strong fire. But when this happened, by a coincidence of the most unusual kind, some original brain thought about the strange change of solid to liquid, and even had the energy and enterprise to experiment.

One is apt, when thinking over the mastery gained by mankind over Nature by the arts of working in metal, to forget that this great discovery need never have happened at all. It is not often or usual that the inventive, original thinker has the practical skill and courage to push through an experiment, but the coincidence of "Tubal-cain," actually seeing the smelting, and having his attention interested in a paltry domestic accident, is, when one comes to think of it, altogether extraordinary. For it is the fact that the Red Indians used copper, but had never found out how to smelt it. A great mass of native copper near Lake Superior, weighing six tons, had been pounded with stone hammers, and the lumps broken off were beaten into shape.[1] They had never realized that it could be smelted or cast.

The axe and knife gave man a power of dealing with the forest and scrub which he had never before possessed. The spade, adze, and sickle revolutionized agriculture. The spear, sword, and dagger seem at first to be unmiti-

gated evils. Certainly the utter wiping out of the old artistic civilization in Mesopotamia, in Crete, in Egypt, and at Troy, were horrible disasters. But as we shall try to show later, those States which arose out of their ashes were different; they possessed a stronger fibre and harder grit. Man had been forced to grapple with sterner necessities of life, and came out of the conflict on a higher level of humanity, and with increased possibilities.

Just as in other cases of great discoveries, the researches of the last few years point to a very much older date for the discovery of copper than had been supposed.

Although there is the usual strong opposition, we shall adopt the views given by Mr. Gowland in a most interesting paper, to which we refer the reader for further details.[2]

We find, then, a strong probability that copper was known both in Egypt and in Chaldæa somewhere about 5000 B.C. In the tomb of Menes (4400 B.C.) copper occurs. King Ur Nina in Chaldæa seems to have known of it also about 4500 B.C. It seems most probable that the first mines were those at Diarbekr on the Upper Tigris, Armenia, near Erzroum, and south of Trebizond. The knowledge reached China, at any rate, about 2205 B.C., when nine bronze caldrons were cast, so that China was, in the Bronze Age, perhaps as early as 3000 B.C. In a westward direction, at Troy (first prehistoric city, Hissarlik), knives with rivet holes seem to have been in use from 3000 to 2500 B.C. In Cyprus, where there are enormous mounds of slag, it may have been known as early as 2500 B.C.

By 2500 B.C., according to Montelius, it was known in Spain and in Britain, and had reached Italy and even Scandinavia not much later (South Italy, copper daggers, 2100 B.C.).

From the geological evidence, it is likely that the Copper Age began after the Daun period, for in that period the Albula and Fluela passes were not in existence,

and these were used by travellers in the Bronze Age.[4] We have supposed the Daun period to have been about 5000 B.C., which gives just a convenient interval for the Neolithic. At first copper seems to have been used rather as an ornament and as a curiosity than in regular everyday practice. That is quite natural, for a very long period would pass before the deposits in Spain, Cyprus, the Tyrol, Tuscany, etc., were discovered, and arrangements could be made either to transport the ore to civilized places where skilled labour was available, or to conquer and enslave the natives—a necessary preliminary before working them on the spot.

There were, for instance, copper rings in the lake dwellings of the Mond See, at latest, in 2500 B.C. The copper stain found at Stonehenge (1800 B.C.) may have been from an ornament of some kind. Such extravagances as the gold-plated sword with an onyx pommel found at Crete, though of much later date, probably show that in the earlier period of copper it was a strange and valuable ornament, and also perhaps a scientific curiosity.

Later on, when the practical advantage of metal was known, copper axes and sickles were regular articles of commerce.

There were mines in existence before the use of metals, for, as we have seen, flints were dug and exported in Belgium in the Neolithic (p. 347). Jade was an article of trade, and it is supposed that it was brought from the Kuenlun Mountains in Turkestan, and distributed through Asia Minor to Hissarlik, and even to Sicily and Malta.[5]

The methods employed by the early miners seem to have been extremely simple. In order to break off the ore, a huge mass of brushwood was lighted against the face of the rock. The ore was hammered to pieces with big stones. In Corea there is a huge natural boulder of granite with the flat side uppermost, upon which rests another

great stone. Some ingenious prehistoric mining engineer saw the possibility of this as a crushing mill. Two poles are tied to the loose stone, and four men rock it backwards and forwards so as to crush the ore placed underneath. In later days the ore was sometimes ground in ordinary stone querns.

Similar methods prevailed in ancient Rhodesia, where gold was pulverized in stone mortars or ground between

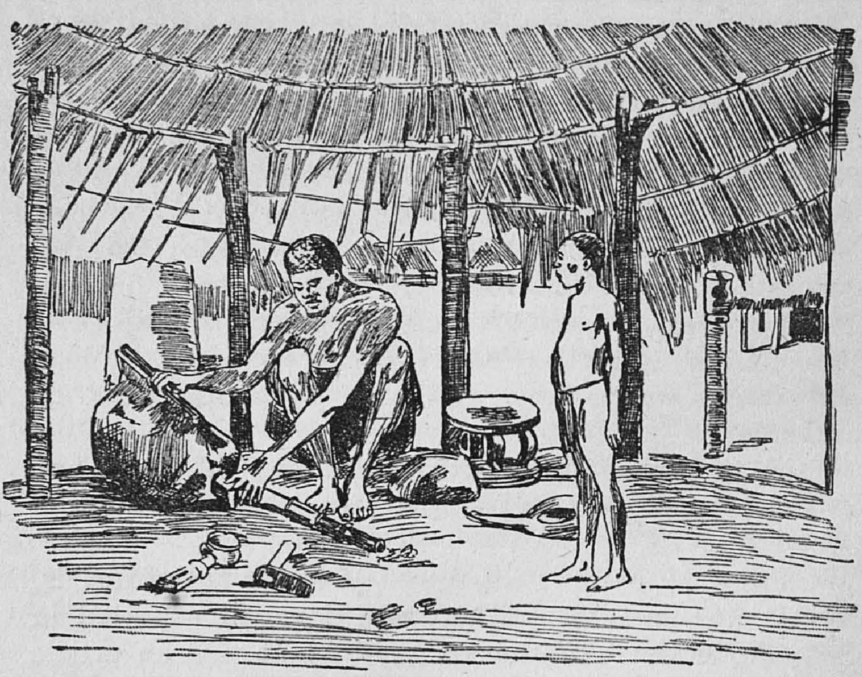


FIG. 37.—SMITHERY, KATANGA, SOUTH-EAST CONGOLAND. (FROM AN ORIGINAL DRAWING OF THE KATANGA EXPEDITION.)
(Frobenius, *Childhood of Man.*)

stones. Here also a fire of wood was lighted against the rock face, and after the ashes had been removed water was thrown on it.

Few of the workings in South Africa go below 12 feet in depth, but in other places the mines consisted of irregular winding burrows 30 feet deep, with here and there rough

wooden ladders. The water and ore was carried in wooden or hide buckets. The smelting arrangements were also of a very primitive character. At first it was just the domestic hearth, a mere hollow of clay over which the fire was lighted. Later on special furnaces were built, but these were only deeper clay-lined hollows, more or less of crucible shape, and heated by layers of charcoal and brushwood alternately. Water was thrown on the melted ore, which congealed in lumps and was then picked off.

So also in later times, when tin was mined, the original furnace was a narrow and shallow trench in the ground covered by brushwood and logs. Afterwards a vertical shaft was made in the side of a steep ravine, and filled with layers of charcoal, ore, and brushwood. Lead was obtained in very much the same way. The "boles" of Derbyshire are the ancient furnaces. They were built on the brow of a hill facing west, and the galena and fire-wood were mixed together. This method was still in use in England in 1681, and is probably still employed in Bolivia.[6]

These methods are not essentially either more scientific or more practical than those adopted to-day by the negro blacksmith in many parts of Africa. The latter's bellows, made of goatskin, are very carefully prepared, and are by no means inefficient. In Africa iron only is worked, and it has been suggested that in Africa south of the Sahara the Bronze Age never existed.

There has been much discussion as to how the ancients discovered the right proportions of tin and copper for their bronze work. But there are extraordinary variations in the amounts of the various alloys which, seems to show that the proportions depended in large part on the impurities existing in the only ores which they could get. They probably had a vague idea of the effect of the tin, and altered the proportions according to the particular vessel which was required. We must now try to trace more closely the manner in which the first copper pene-

trated Western Europe. Perhaps the village of Jordansmuhl, on the left bank of the Oder, not far from Breslau, gives as good an idea as we can expect to have of the life in Europe generally at the beginning of the Copper period.

The people were living in round huts, 9 to 12 feet in diameter. The walls were made of branches plastered with clay, and the huts were below the level of the ground. The village was on good, grassy land of rich humus and surrounded by woods. They cultivated corn, probably burning the forest annually, and possessed the "Celtic shorthorn," and two kinds of dogs (*palustris* and *intermedius*). They were also hunters, for they killed boar, urus, (wild oxen), red deer, and roe. They had both adzes and axes of stone. These were not very carefully made. The women spun flax, using spindle-whorls of clay, and seem to have been richly supplied with pottery (*Bandkeramik*).

For ornaments they used boar's teeth and also copper spiral ornaments and beads formed of rolled copper. A young girl, perhaps twenty years old, who was found buried at a depth of 3 feet (quite close to one of the huts) wore a complete necklace of these last. She had also a red-deer antler pointed at the tip, probably the pickaxe which she used in cultivating her patch of corn, as well as a bone bodkin and a stone celt. A curious point is that below a circle of stones with animal bones, there were four dogs' heads placed symmetrically with the fangs outwards and at the corners. The soil was covered with a heap of small stones nearly 6 feet deep.[7] This no doubt superstitious ceremony may have had something to do with the ever-present danger of wolves. The people who lived in this village belonged to the two types, Cromagnon and Furfooz,[8] which, as we have seen, persisted in Europe ever since the Riss-Wurm Interglacial.

How did they get the copper? Clearly by trade from apparently the south-east. Whether traders came themselves or whether the articles passed from hand to hand

in village markets is immaterial. At a somewhat later date in Thuringia we find distinct evidence of trade on a much larger scale. In Thuringia, not very far from Breslau, no fewer than 297 axes were found at a place called Bennewitz, and 84 sickles at Bedra. It seems that these were exchanged for salt.[9]

The evidence from these two places—Jordansmuhl and Breslau—points first to the very important fact that the descendants of the Cromagnon hunters (our Azilians) had become more or less settled and civilized people.

If an invading tribe of eastern barbarians merely swept through the country, killing the men and enslaving the women, it does not seem likely that they would bring large numbers of sickles with them. The facts are best explained by supposing that a great and prosperous trade was going on between the more civilized Mediterranean and the barbarous northerners.

So also in the south there seems to be some evidence that a knowledge of copper gradually spread north-west from Spain to Brittany and England. At first ornaments, then axes, sickles, and daggers; but before very long both spears and swords were being manufactured for export. They would be traded along the dolmen route through the Ligurians of North Italy, the Iberians of Spain, the original dolmen-folk of France and Southern England as well as of Wales and Ireland—that is, through all the settlements of the Mediterranean race.

By the other route—across Thuringia, Silesia, and down the Elbe, Oder, and Rhine—these weapons would reach first the lake-dwellers (Furfooz race × Cromagnon), in whose villages the long-headed Cromagnon folk were most numerous just before and just after the beginning of the Bronze Age. Farther north the weapons would come into the hands of more decidedly Cromagnon folk with but little of the Furfooz cross.

Somewhere, however, in the Early Bronze period, there seems to have been an invasion of eastern people of

brachycephalic stock and with bronze weapons. A race of warriors and hunters seem to have temporarily subdued a large part of Central Germany as well as Switzerland and part of France (see p. 373).

But much in the story of the evolution of axe, spear, and sword throws light on primitive man. The axe at first is simply a polished stone axe cast in copper. Even in the Second period, though more like an axe as we understand the term, it requires flanges or wings to grasp a wedge or handle. In the Third Bronze period palstaves with stop ridges appear. In the Fourth, socketed axes come into general use. In the Fifth period winged palstaves and an advanced type of socketed axe come into use.

A halberd with three rivet-holes is common in the Second period, and also daggers with a tang which was inserted into the handle. By the Third period the daggers are either riveted or have a long tang with rivets. In the Fourth socketed spearheads with loops appear, and also, which is of more importance, there are longer daggers and swords of quite an effective kind. In the Fifth period swords are usually leaf-shaped with a notch below the hilt.[10]

The spear has been traced through all its stages by Canon Greenwell.[11] It was at first a dagger-blade with a tang which was inserted in a socket of the shaft. Then the socket and blade were cast in one piece with a rivet-hole to fix it firmly. But this gave hardly sufficient strength to the attachment, and so side-loops were cast on the edge of the socket. These were at first low down, but as time went on shifted their position upwards towards the blade.

The net result of this evolution in the weapons of warfare was that in England, from 1400 to 1150 B.C., and at an even earlier date on the Continent, formidable swords existed, giving to those who had the strength and courage to use them an overwhelming advantage over weaker and less spirited races.

The effect of this development will appear in the next chapter.

[1] Gowland, *Jour. Roy. Anthrop. Inst.*, July-December, 1912.
[2] Gowland, *loc. cit.*
[3] Blanckenhorn places the Copper Age in Palestine between 2000 and 1250 B.C. At the latter date iron was introduced by the Philistines (*L'Anthropologie*, 1906).
[4] *Ibid.*
[5] Bradley, *Malta*, 1912.
[6] Gowland, *Archæologia*, vol. lvi., part ii.; vol. lvii., part i. vol. lviii., part ii. *Jour. Roy. Anthrop. Inst.*, July-December, 1912.
[7] Seger, *Arch. f. Anthrop.*, 1906.
[8] Schliz, *Arch. f. Anthrop.*, 1910.
[9] Goetze, *Man*, 1909, 82.
[10] Montelius, *Archæologia*, 1908, vol. lxi., part i.
[11] *Archæologia*, lxi., part ii.

CHAPTER XXVI

WAR AND IRON

It is doubtful if serious war was known in Europe until the Bronze Age was established.

During the Neolithic period there is abundant evidence of colonization, of the opening up of new ground, and of a quick, luxuriant growth in civilization and in refinement, but none of serious war. No doubt there were squabbles between villages, and occasional raids of savages in which cattle were carried off, and perhaps women stolen.

But in Britain, from the Second period of the Bronze Age until the union of the Crowns three hundred years ago, war, with insecurity of life and property, was the rule, and peace was exceptional. This was the case not only in Scotland and Ireland, but even in England, except in certain favoured districts. That this was so can be shown in the extraordinary variety of defensive arrangements belonging to the bronze, iron, and mediæval times.

The "vitrified forts" in the Western Highlands are remnants of the ancient beacon fires. Cities of refuge—that is, "camps"—are to be found all over the southern counties. The most pathetic of all such attempts to maintain a purely defensive attitude are the walls intended to keep out the enemy, which required enormous labour, and which were never of the least use.

There were not only two Roman walls, but the Devil's Dykes of Scotland, and a similar dyke running from the impassable marshes of the fens to dense forest which covered the rich territory of the Iceni (Norfolk and Suffolk), where every man seems to have had a considerable holding of some 230 acres.

Sometimes the village was placed on a height with a winding narrow entrance; sometimes sharp splinters of slate were placed along the threatened front.[1] The moat and the peel-tower which followed it are governed by the same necessary law. So also the weem, the broch, the round towers of Ireland, show that the community was numerous and wealthy, but could not defend itself.

The lake dwellings, inhabited until perhaps A.D. 1200, are another sign of the same insecurity. Nor are these evidences confined to Great Britain and Ireland; they are to be found everywhere on the continent of Europe.

All over the known world from the First or Second Bronze Age until the Romans had conquered the whole civilized earth, signs of war and of destruction can be traced everywhere.

So far as one can gather from the records of the Neolithic period, village communities, more or less in touch, were spread like a network all over Europe, and perhaps also all over Africa.

The richest and largest were, of course, those of Mesopotamia, Egypt, Crete, and Greece. In these largest cities there were probably despots of the ordinary Asiatic type; they enjoyed an extraordinary luxury, great wealth, and much artistic development.

Such cities would lay under tribute any smaller communities with whom they cared to deal. Traders travelled from them possibly to South and West Africa, certainly to the Baltic, and westward to Spain and Britain.

Those villages which were near the Mediterranean would be more or less organized, but the farther the trader went, the more primitive would be the type of village.

The successive stages by which a kind of organization is obtained is well shown in French West Africa; the negro villages show all stages in the growth of it. Certain tribes still live in families; each cultivates his own patch of tilled forest, and obeys his father and uncle when he feels inclined to do so.

This would correspond to the Palæolithic and kitchen midden or the very early Neolithic stage. Other negro peoples, *more exposed to attack*, live in villages, and under authority, for, with many men living together, a certain amount of obedience becomes necessary. This authority is exercised by old men.

These are, of course, distinguished for wisdom, a strong personality, and are very often also diviners and more or less wizards.[2] This stage corresponds exactly to the larger and later Neolithic communities, where also superstition prevailed. The great civilizations had of course advanced a step farther, for despots of the Eastern type, perhaps at first priest-kings, existed even at 5000 B.C. But in West Africa, indeed in Africa generally, the final touch of organization is very rare. An absolute war-lord, who could rule not only the people but the priests, and who could lead effectively in battle, did indeed arise in Zululand and in Uganda; but very seldom anywhere else. This last development had not occurred in Neolithic Europe. Such monarchies as existed seem to have been based on wealth, unscrupulous cunning, and superstition.

With the discovery of copper, there seems to have been a sudden rapid growth of mining and of trade. Immediately afterwards there is clear evidence of serious, pitiless and disastrous warfare.

One after another the great civilized city States of the Far East, of Crete, Egypt, and Mesopotamia were overthrown and destroyed, but only to rise again after a more or less prolonged interval, sometimes in a still more vigorous condition. During the period from 2500 to 1200 B.C., whatever there was of civilization and of refinement in Europe and the Ægean vanished beneath the inroads of fierce barbarous warriors. Greece, Carthage, Rome, and Egypt, were destined to revive and become more magnificent and more luxurious than ever.

That these northern barbarians initiated a *recul de la civilization* is admitted by such different authorities as

Reinach and Sergi, and indeed we believe by all who have reflected on the general story.

There seem to have been two distinct and separate hordes of invaders. The very first disturbance seems to have been produced in the Copper Age by an Asiatic horde presumably entering Europe by the valley of the Danube. They conquered the various countries surrounding the headwaters of that river, and appear to have established themselves for a time in fortified villages.

If we consider them to be the ancestors of the Alpine race, and to have brought with them the custom of burning their dead, of head-hunting, and of using especially the bow and arrow, then perhaps they coincide with the "Glockenbecher" people of some Continental writers, and with Mr. Crawford's "beaker and flat celt" invaders (see above, p. 236). They were apparently brachycephalic, or round-headed, and brunettes. If so, they seem to have entered Europe about 2500 to 2000 B.C., or even before this date. That such a horde of invaders did enter seems a necessary hypothesis. Cremation was not previously known in Europe, and though there were round-headed or brachycephalous people (the Furfooz race in the Swiss lake dwellings), these were but few in numbers.

It seems that they (we shall call them the Glockenbergers) occupied a very large part of South and South-Eastern France as well as Switzerland. Probably, in consequence of their inroads, many of the lake dwellers fled across the Alps into Italy, where they reached Central Italy and mixed with the original Ligurian population, which was of Mediterranean stock. The Glockenbergers penetrated northward, for their settlements occur at the junction of the Rhine and Main, on the *Zuyder Zee*, near Stettin on the Baltic, and at several places on the Elbe. That is, they followed the regular amber trade routes northwards, but did not succeed in occupying the country of (in after-years) the Northern race—that is, the home of the future German, Anglo-Saxon, and Scandinavian,

Yet, according to Mr. Crawford, they reached the east coast of Scotland as well as Yorkshire, and the chalk outcrop of the Fens as well as the Berkshire and Marlborough downs.[3]

But it is extremely difficult to understand how the Glockenbergers could have crossed the North Sea at such an early date as we have supposed. It seems much more probable that their entrance into Great Britain was from the south coast, and at a much later period. If these Glockenbergers were an ordinary Asiatic robber horde, then they seem to have given to the scattered and probably quarrelsome and litigious savages of Scandinavia just the rough contact that forced them to organize for defence. It is admitted, even by some German authorities, that there must have been a period during which the original ancestors of the Northern race were subjected to a Celtic race. If so, this is the only possible period. If these invaders spoke the ancestor of all the Aryan tongues, the forefathers of the Teutons may have learnt to speak a sort of pidgin-Aryan, which has now become Dutch, German, and Scandinavian. But if the Glockenbergers were really the first speakers of an Indo-European language in Europe, when and where did they branch off from the other hordes which went to India?

Ujfalvy believes that the original Aryan horde was settled to the south-west of the Caspian Sea in 2000 B.C.[4] They seized the Persian plateau of Iran, and in 1900 B.C. came down into Babylonia, bringing with them horses, which were unknown in Babylonia before this date.[5] The Aryan invasion of India is often given as 1500 B.C.; but if they also went eastward about 1800 B.C. to colonize the Punjaub and India, this would agree with the views of other authorities. (See note, p. 379.)

So the hypothesis that these Asiatic round-headed invaders of Europe, about 2500 to 2000 B.C., were the original Aryans is by no means impossible. They would have left their original home before 2000 B.C. Part of them passed

north of the Black Sea, and wandered into Europe; others invaded Persia, and there divided, one section entering Babylonia, where they made treaties with the Hittites as late as 1300 B.C., another crossed the passes into British India. But there is always the greatest uncertainty when questions of language are allowed to influence the story of prehistoric migrations, and this solution of the question is not commonly held.[6]

We must now return to the story of the Copper and Bronze Ages in Europe after this first entrance of eastern Glockenberger invaders.

Matters settled down again, and the process of trade continued. Amber and jet were exchanged for ornaments of gold, and especially for the latest and best weapons.

The civilized cities of Troy, Crete, Greece, and elsewhere —as, *e.g.*, in Malta—seem, as we have seen, to have worked the mines of Elba, Etruria, and perhaps those of the Taurus and Erzroum.

Axes and daggers were being turned out in quantities and traded northward to the barbarian ancestors of the northern race. Commercial greed would seem, even at this early date, to have been unaffected by any, the most obvious forebodings. To-day business firms supply the best modern rifles to the Abyssinians and to the wild tribes of the Indian frontier, though they know those arms will be used against British troops who have to protect the would-be peaceful natives of Somaliland and British India. So, some 4,000 years ago, the rich cities of the Mediterranean supplied wild savages of the marshes and forests of Northern Europe with the best bronze weapons.

For perhaps 300 years bronze weapons improved. The rude barbarians of Schleswig-Holstein and North Germany increased in numbers and assimilated the Glockenberger and other brachycephalic immigrants.

Then, at or before 1700 B.C., the inevitable happened. Armed bands of magnificent barbarians, 6 feet in height, armed with good bronze axes and daggers, with fair hair

flowing over their shoulders, and blue eyes, began to come southward. They were tireless, inured to starvation, accustomed to every hardship.

The leader was the cruellest and strongest man in the band, shrewd and determined. He had never known fear, or superstitious dread, or human kindness. The one good quality in which they were far above their civilized opponents was a certain respect for women. This did not interfere with the most horrible cruelty to women, children, and old people, but nevertheless it did exist.

The first sign of them in the South seems to have been an immigration *en masse* across the Alps, probably of the lake dwellers and other peaceable folk flying before them. These refugees built the lake dwellings of Venetia and also the Terra Mare, and spoke an Aryan tongue. If M. Siret is right in his conclusions, northerners did not enter Spain at this time, but turned eastward through Austria, and thence began a career of conquest and destruction of which the effects are only now beginning to be understood.

Greece and Macedonia were overrun by fair-haired Achæans and others. Asia Minor was attacked and much of it occupied. The Kurds of Persia to-day are probably descendants of these northerners. Part of them seem to have been the Amorites, or children of Anak, mentioned in the Bible. Another band, joining with wild Libyans, fought against Egypt. Mr. Mehlis thinks that another invading army crossed by the Straits of Gibraltar and occupied Morocco and Algeria. What chance had the slim, graceful Cretan dancer, or the slightly built Mediterranean folk, or even the Asiatic and Egyptian serfs, against these hardy savages armed with efficient weapons?

It is very difficult to trace such movements so long before the historical period (this was 1,000 years before Homer's time), but most authorities seem to be adopting the views sketched above.

The subsequent history of the Bronze Age is in a hope-

less tangle. It is possible that here and there, especially in the islands, some of the civilized city States escaped destruction. The power of the Phœnicians—that is, of Sidon, seems to have steadily increased. After the first destruction there was a vigorous, quick growth in Greece, Asia Minor, and perhaps in Crete.

When the energetic barbarian element had mingled with and influenced the Mediterranean race, there was a revival of commerce and trade, an even more strenuous exploitation of mines; more wealth and luxury, and perhaps even more corruption.

But better weapons of bronze were being produced; sword and spear were in use in France and England in 1500 B.C. Iron was already known, and beginning to be appreciated. Iron vessels were used in Egypt in 1500 to 1450 B.C., and probably at a very much earlier date in Assyria. It is said that King Sargon obtained enormous quantities in tribute from the Taurus and Anti-Taurus. There were great mining-centres, such as Hallstatt, Etruria, and the island of Elba. By about 1000 B.C. the Iron Age had begun in China, perhaps in Japan, in India, and at a still earlier date at Hissarlik (Troy), and also both in Cyprus and amongst the Sidonians, who were then the great maritime trading nation of the Mediterranean.

Precisely the same foolishness was shown in the supply of swords and spears to the northern barbarian, and the same results followed. About 1300 to 1200 B.C. more northern barbarians came down on the more or less civilized Mediterranean. The Celts, a mongrel race, half northern, half Alpine, crossed into Spain, drove out the Sidonians, and destroyed their mining operations. It was, so far as we can see, about this time that the first Celtic invasion of Britain occurred. These Gaelic-speaking invaders seem to have followed the dolmen track into England, and onwards into Ireland; probably also into Lincolnshire and Yorkshire.

In Italy the Umbrians came over the Alps, chased the

Terra Mare folk out of their villages, and were soon at war with the Etruscans, who came from Asia Minor by sea.

If the reader will glance at the table facing p. 234, he will see that in Mesopotamia there was a nearly continuous series of invasions. The Etruscans may have been driven out by one or other of these disturbances. About 1100 B.C. Babylon and Assyria became stronger and richer empires than had ever existed before. The Jews, however, had managed to establish themselves and hold their own in Palestine throughout the whole of these wars and invasions. David is supposed to have been in power about 1000 B.C.

Crete was utterly blotted out as a centre of civilization in 1200 B.C. by the Dorians with iron weapons, and by 1000 B.C. Greece itself was overthrown by the barbarians.

These two series of invasions in 1700 B.C. and in 1200 B.C. were more than a *recul de civilization;* to anyone who lived at that time, it must have seemed as if the whole fabric of civilization had broken down, and as if the world could never recover.

But it was out of this horrible compact of barbarism and civilization that even greater States with more inhabitants and on a higher scale of organization were about to arise. Nothing but this perpetual danger could have forced the Greek towns to hold together and to discipline themselves. In Italy the military insight of the Romans, their peculiar combination of sound common sense, ruthless justice, and daring enterprise can be traced to the extraordinary mixture of southern and northern races, and to their exposed position on the very frontiers of barbarism.

England had still to go through the second Celtic invasion (Welsh speaking division). Scotland, France, and Germany, and all the northern nations, were still inhabited by barbarians, who could only maintain some sort of possibility of life by a salutary rule that once in

five years every son of the house, except the heir, had to leave the country.

But there are certain plain deductions which we venture to draw from the horrible fate of the Mediterranean civilizations. They were destroyed because every man in the community was not trained to serve his country in war. Nor was there any organization for defence. The Baltic was as far from, for practical purposes, Crete as China or Japan is from London.

It looks also as if the pitiless destruction of war often revives and invigorates a decaying nationality. Like a hard frost in winter which pulverizes the soil and kills all except the most vigorous of the bacteria, worms, birds, and animals, serious war results in the destruction of parasites and unhealthy growths of all kinds.

The effect of the proved history of Hissarlik, of Crete, of Malta, of Sicily, and many other once famous States on Mr. Angell's arguments is obvious, and requires no comment.

[1] Hughes and Gardner, *Arch. Cambrensis*, July, 1906.

[2] Ruelle, *L'Anthropologie*, 1904. For further details the reader must be referred to this interesting and critical study.

[3] See Mr. Crawford's map, *Geog. Jour.*, August, 1912. It seems more probable that the first copper axes, and perhaps the beakers, entered by the dolmen route from Spain, and by way of trade.

[4] Ujfalvy, *L'Anthropologie*, 1902. Lapouge gives 1500 B.C. as Aryan invasion of India.

[5] Meyer, *L'Anthropologie*, 1908.

[6] It is perhaps more usual to suppose that the Aryan languages were distributed and spread abroad by the great invasion from the North of 1700 B.C. But we find more difficulties in this solution, which would make all languages of the Aryan group derivatives of the first German tongue. The dolmen folk can hardly have spoken an Aryan tongue. In the table on p. 234 we have given both 2000 B.C. and 1500 B.C. for the Aryan invasions of India. It is quite possible that the invasion extended over a long period, but if one date has to be selected, 1800 B.C. seems most probable.

CHAPTER XXVII

THE ASCENT OF MAN

THE story of the ascent of man from the very limit of humanity to present-day civilization is in no respect easy to read: perhaps it is the very difficulty that constitutes the charm of it. When a twentieth century European tries to understand the point of view of a very primitive mind, he is liable to make mistakes. He can neither understand savage motives or the savage character.

A native policeman in Papua, a man of some ability, shot a cockatoo, which was his "totem." He was so upset by this evil deed that he cried all night and fully expected to die.[1] Yet we do not think that Papuans could be called either specially conscientious or particularly tenderhearted.

So also the Rossel Islanders, an unattractive people, who are gloomy cannibals, and treacherous murderers, worship a deity who lives on the mountains. The paradise to which they expect to go is a beautiful garden in the hills. They also plant flowers for the sake of their beauty, and treat their tame cats and parrots in a human, kindly way.

In North-Western Brazil, amongst a race of Indians who are apparently of a distinctly cruel disposition, Koch Grünberg was annoyed with a boy who seized and spoilt a splendid butterfly that he had just captured, and scolded him with "einigen heftigen Worten." The boy stared at him in astonishment, with his great mild eyes, and then burst out crying and ran away. The traveller also had to

endure a severe talking to from an old Indian woman because he had been so unkind to the child.

But when it is a question of motives, of religion or morality, the difficulty becomes extreme, and is quite insuperable. Few travellers realize how many mistakes they would make if they tried to describe the real morality or actual religion of even their dearest friends; yet they think that they can describe the beliefs of peoples belonging to a different race and in a lower stage of evolution.

And yet, though the savage mind is distressingly inconsistent and cannot be wholly understood, there are certain beliefs and ways of looking at the world which help to explain the story of mankind. Thus, it seems true that almost every race of man is not only capable of believing in a supreme God, but so far as the evidence goes, did reverence one God, who was often also thought of as the Creator of the Sky or of the World. We shall mention a few instances, for on this point there seems to have been an extraordinary disinclination to accept the plain statements of those who knew natives best.

The Bantu negro in many stocks certainly, and perhaps in all, holds this belief, which perhaps is one of the reasons why he accepts Mohammedanism.[2] The Andamanese (according to Man, Portman, and Schmidt) believed originally in a Supreme God who was associated with the storm and ruled thunder and lightning. It is the case that this statement has been questioned, but by a gentleman whose knowledge of the people cannot obviously be compared with that of other observers.[3]

So also with the inevitable Arunta or Aranda of Australia, Strehlow, who could talk their language, declares that they believed in an eternal Altjira, an exalted Good Being who lives in the sky.[4] It is quite unnecessary for us to quote the numerous cases of early tribes who believe, or used to believe, in one God. To these instances of pygmy, Australian, Bantu negro, we shall add two of Mongolian affinity—viz., the Naga tribes of Manipur, who are of

Tibeto-Burman stock, and the Chinese, who, according to Giles, have a belief in God, in addition to Confucianism and other religions.[5]

In America, Mitchi Manito the Mighty seems to have been originally worshipped as the Supreme Deity of the Red Indians; the Natchez worshipped the Creator, Coy-cop-Chill. In Central and South America, the Chibchas are monotheists, and many other of the primitive tribes.[6]

In Babylonia and Assyria, there seems to have been at first a pure and perhaps refined monotheism not unlike that of early Judaism.[7] So also under the multiplicity of gods and goddesses in Egypt, it is supposed that an original worship of one Supreme Deity may be recognized.[8]

It certainly seems to us that there is a very strong body of evidence showing that every race of mankind possessed quite early in its development a feeling of awe and reverence towards an Unknown God. Nor do we think that the strenuous opposition to every case which has ever been brought forward is always quite as impartial and unbiassed as the opposers themselves believe. We doubt if any human being can study this question without being influenced unconsciously by his own personal beliefs or by his unbeliefs. Prayer and offerings are made by many primitive people in a manner which perhaps seems to us childish, but for us to understand what it means to themselves is a difficult, perhaps insoluble, problem.

At daybreak the priest of the Natchez Indians salutes the Rising Sun with loud cries, and, calling for his calumet, offers him the first three puffs.[9]

This tribe of the Lower Mississippi is of particular interest on account of the close resemblance of their sun and fire worship to that of the pre-Columbian Mexicans. The medicine man in Kikuyu, before attending to his patient, stands erect in the middle of the village, holds up his bag of medicine, and looking towards the snow-capped summit of Mount Kenya, calls upon God for wisdom, and

that his medicine may be efficient, and may result in prosperity and good luck to the village.[10]

Sternberg, when in a small frail canoe on the stormy waters of the sea of Ochotsk, found himself in imminent danger; the Aino in charge of him, cut a small shaving off his wooden talisman or "Inau" and flung it into the waves, shouting, "Go to the Spirit of the Sea and tell him that it is in his honour. Would it be proper if we went down with the Russian gentleman in our canoe."[11] This use of something to symbolize the petition, reminds one of the peculiar many-coloured sticks decked with maize-bracts and feathers, and called "bahos," which are used by the Hopi or Moqui of North-East Arizona. They are laid on the ground, or in rock crevices, when prayer is made, and the feathers are supposed to carry the message.[12] The belief in a future life seems to be another nearly universal instinct in every race.

A curious fact is that the three forms of disposal of the dead, by simple burial, burial with disarticulation of the body, and cremation occur not only in the Old World, but also in the New. We take it that this shows that the origin of these customs belongs to a very early, at any rate to a Neolithic, stage of culture.[13] Another curious point is that mummies were only known in the Canary Islands, in Egypt, and in Peru.[14] Probably they hoped to insure an immortality of the body as well as of the soul.

The remarkable profusion of wealth in "grave goods" left with the dead has been already alluded to several times. This surely means a confidence in the reality of a future life. A few cases will show how widely spread is this custom, and how much is often sacrificed.

Amongst the Sulka of New Pommern, the dead man's plantation is cut down. Swine are slaughtered, and his weapons are broken. Probably before the days of white control, his widow was also sacrificed.[15] In North-Western Brazil, the man's bow and arrow, his fishing-tackle, and other possessions are burnt on his grave. So

also a woman's baskets and sieves are burnt, and her pots are broken in pieces, and thrown away in the bush.[16]

Some authorities are inclined to ascribe these sacrifices to a fear that the ghost may return. But the custom of such sacrifices is nearly world-wide, and, in most cases, the ghost explanation does not hold. For instance, in Crete, live coals seem to have been taken from the house-fire, for tripods and chafing-pans, filled with charcoal, are found in the tombs. The dead within were thought to be cold.[17]

Even in South America burning and breaking of weapons are not universal. So, for instance, amongst the Huitato tribe, Putumayo, the "*capitan*" wrapped in a new fibre-hammock is buried with all his weapons and utensils under his own house.[18] In Europe also, in Palæolithic and Early Neolithic burials, there seems no proof either of the burning or of the destruction of weapons. Fear of the dead man's ghost can hardly be demonstrated until the Late Neolithic.

The way to the other world seems always to have been considered a difficult and dangerous one. But there is often a literary and artistic beauty about the ideas of the last journey which seem to involve a touch of conscious invention beyond the primitive level. In Assam, for instance, the Garos believe in a monster "Nawang," which harasses the ghosts of the dead on their way to Heaven. But it flies in terror from the shade of the man who had married one thousand wives.[19] But we take it that all the earliest of mankind believed in one God after their manner, and in a future life, though, no doubt, of a gross material kind according to our ideas. In spite of this it is quite clear that at a very early period of man's history, this belief was overlaid by masses of fanciful superstition.

We have noticed the first sign of magic in the late Magdalenian when the love of art for art's sake became spoilt by ulterior motives. When the hunter had begun to paint arrowheads on the vital spot of his bison, magical

arts began and no doubt continued. This stage was the culminating point of the Magdalenian just before the migration of the more vigorous members of the tribe. It is true that some authorities consider that all these drawings are more or less magical, and especially those few drawings of men and women which have survived. But primitive man was, no doubt, both coarse and vulgar in his ideas; not only fond of caricature, but with a distinct sense of humour. The same traits exist, not only in modern savages, but even in children at a certain age, whose drawings are equally coarse and vulgar. This simple common-sense explanation seems quite adequate.[20]

As soon as men began to live in villages, or in scattered hamlets under the control, more or less, of the older and shrewder men, there seems to have been always a great development of magic as well as of other arts. How were these older and weaker men to keep the vigorous youngsters in due control? By cunning, by playing on their fear of ghosts, of things of darkness and of queer slimy creatures (associated with snakes). There were, as we have seen, distinct religious instincts quite as far back as we could expect to find any evidence of them. Also, at a very early date a knowledge of vegetable poisons existed. So, such an idea as slashing the tongue or wounding the body to make the blood flow might have been encouraged by the original caste of ruler-priest-magician-doctor, for they combined all these functions.

The object of these cruel rites would no doubt be represented as an act of worship (which it really was, at least in a sense).

The practical advantage to the ruling caste would be to destroy opposition. No one with a tongue sliced could utter objections, and loss of blood would subdue the more vigorous objectors, who might even have felt honoured by being selected. Not only the Arunta adopted this system, but the priests of Baal, of Cybele, and of Mexico made incisions in the tongue, on the arm, and in the ears

of their victims, and in all these three cases with obsidian knives.[21]

So, also, out of the kindly affectionate instinct which left with the dead man all his valuable and his best arms, there arose in later times, when a great chief died, the most horrible cruelty.

The policy consisted in flattering the ruler and his court, in the opportunity, of putting the fear of death into every soul in the community, and of exalting enormously the power of the priest-wizard-doctor caste. These temptations were great, and it is not in the least surprising to find that instances of the same kind could be brought together from, we think, every part of the world *where there was no dangerous foreign enemy*. The mourning for the King's mother in Zululand, when hundreds were killed, is a well-known case. Amongst the Babinza, men, women, and children were purchased, killed, and thrown into the chief's grave.[22] Human sacrifices were common amongst the Druids, in the West African region in Late Neolithic and Bronze times, in India, as well as in China, Japan, Mexico, and the other civilized pre-Columbian States of America.

In most cases these cruelties were only put down by the spread of Christianity and by the control of a European race when effectively exercised.[23]

The barbarian invasions of 1700 to 1200 B.C. destroyed the whole civilization of the Mediterranean, including these horrors. But although in most parts of the world, before the Christian period, no feelings of common humanity intervened, there are one or two instances in which these atrocious rites died out.

The Romans, for instance, put down the cruelties of Druidic hecatombs with a severe and merciless rigour, possibly from policy, but more probably from mere humanity. There is a most affecting story of the horrible sufferings of the personal attendants of Yamato-hiko, younger brother of the Emperor of Japan, who

were all buried with him at Tankizaka in Musa about the year 2 B.C. We forbear to quote this in full, as it might interfere with the reader's peace o' nights. But the Emperor himself, hearing the sound of their weeping and wailing, was grieved in heart, and commanded his high officers, saying: "It is a very painful thing to force those whom one has loved in life to follow him to the grave. Though it be an ancient custom, why continue it if it is bad?"[24]

After this, in Japan, living men and women were replaced in the graves by terra-cotta tubes, of which nearly 4,000 were found in a single interment. In other respects, also, the love of power and the political necessities of the priest-magician-doctor oligarchies seem to have seriously altered the development of religion. Instead of monotheism, an elaborate polytheism came into existence in almost every large centre. It may have been that when various cities were brought under one ruler, each section of the population brought its own god; but full allowance ought always to be made for the powers of invention and imagination of a caste such as we have tried to describe.

So in Polynesia, "one can find anything which one looks for in mythology"—axe worship, sacred dogs, pigs, house-posts, buildings, etc.[25] In Crete, besides sacred bulls, the minotaur, goats, pigeons, serpents and lions, there were the pillar, the double axe, and the trident, as well as sun worship and phallic rites.

In Mexico, the gods and goddesses were arranged in a curiously symmetrical, geographical, and astronomical system. Only the ruling caste could understand complicated systems of this kind. Medicine, worship, any sort of chance or luck in life depended upon them, and their power and esoteric knowledge increased continually. Then came the barbarians, and these wise men with all their painfully acquired knowledge vanished for ever. Many of the magical arts of savage and half-civilized peoples con-

tain an enormous amount of hocus-pocus. Sometimes there is a basis for the object or custom. The use of stone knives in ritual ceremonies persisted both in Europe and America long after the much more useful metal knives were in existence. An ancient venerable custom becomes awe-inspiring to the vulgar.

FIG. 38.—MELANESIAN SEA-GOD. (AFTER A NATIVE DRAWING IN CODRINGTON'S "MELANESIANS.")
(Frobenius, *Childhood of Man*.)

We very much suspect that the mystical use made by the Old Men in Australia of the churinga had a very much more simple origin than is usually supposed. At the last Prehistoric Congress in Geneva, Mr. Barett described some prehistoric amulets from Mexico with rude figures of animals and man. Some were extremely like the churinga. So also are some of the Magdalenian "batons" of the French caves.

Now, according to Mr. Ling Roth, a message stick which is sent in the ordinary course of trade (very much

as the covering letter to a letter of credit) is used regularly, not for any mystic purpose, but simply as a token or mark of identity.[26] In such a community as the Arunta, anything would soon become involved in a mass of mystical awe-inspiring nonsense. We very much doubt whether the churingas were not at first simply message sticks. The ordinary hocus-pocus of "eye of newt," etc.—that is, of anything strange, associated with disgusting things or with darkness—is very widely spread. The Yao witch, for instance, has the owl and hyæna as favourite companions.

At the beginning of the rise of a priest-wizard-doctor class, the temptations to any shrewd and strong personality were very great. All men love power, and at first it was essential for the good of the community that power should be absolutely in the hands of those who were best able to use it. Probably all through the history of such castes there were good and evil representatives, and good and evil in each individual. Some may have retained a pure and lofty monotheism even amidst the most corrupt polytheism. Others, like Mr. Sludge the medium, had got themselves by practice into believing not only in their own righteousness, but in the truth of what they knew at first, and occasionally afterwards, to be a lie.

It may be doubted whether, after all, such castes as we have tried to describe did not do more harm and injury to the ascent of man than those vigorous barbarians who cleared the way for the Roman Empire.

We have tried to explain as clearly as possible the general story of the ascent of mankind, so far as this can be done on an ordinary scientific basis, and by the aid of observation, experiment, and research. But it seems to us necessary to point out that these after all represent but the one side of the problem. Even with all the help of the multitude of observers who are now at work, many of the most important stages or great strides achieved by mankind still remain mysterious and obscure. We have already called attention to some of these difficulties. The

first and greatest step by which our animal ancestor became man is only one of them.

Equally difficult is the origin of all the great discoveries—that of fire, of copper and of other metals, of pottery; even harder to understand is how the idea of a tool entered the head of our earlier ancestors. How did he first think of taming a dog or a reindeer, or of sowing a grain of corn. The first picture, the first sign to represent an object or a number, and the great mental achievement of forming an alphabet, seem to us to far surpass the grandest discoveries of Newton, of Watt, of Darwin or Lamarck. For they were all quite new departures, not in any way necessary developments of what had gone before. The origin of all these great inventions and ideas seem to be often traceable to the most unexpectedly trivial and commonplace incidents. But that makes the story of the problem even more mysterious.

Nor in any one case is it possible, at least, usually, to trace the motive power which induced mankind to venture a great stride forward.

We can sometimes distinguish circumstances of the environment which made it possible.

But many races of mankind failed to advance. One could find an example of some race which has never risen above each one of the great obstacles. Even during prehistoric times, there have been times when all progress seems to have been checked, or rather, when the whole of humanity was deteriorating, or started on a steep downward slope, with accelerating velocity. Yet the result shows that such periods of fall only gave a stronger impetus—a sort of spurt which carried mankind over the next great step upwards.

At first man was one of the animals, worse off than most of them; gradually he gains material well-being, and begins to control his surroundings, to increase in numbers, and to alter or modify the surface of the earth.

But as one traces his story through the Ice Ages and

the Neolithic, through the Bronze Ages, into prehistoric and protohistoric times, one begins (or at least it seems so to me) to realize that the man himself is always improving. The growth of mental ability steadily keeps pace with the more complex environment.

Not only so, but each century that passes reveals a purer morality and higher, more enlightened, ideals. We draw, then, from the story of the ascent of man, this encouraging conclusion that there is an ever-continuing improvement in humanity. We venture to say also that each succeeding race possesses a truer religion and a less primitive recognition of the Creator of the Universe.

[1] Murray, *Papua*, 1912. Koch-Grünberg *Arch. f. Anthrop.*, 1905-06.
[2] *Cf.* Ankerman, *Arch. f. Anthrop.*, 1905-06.
[3] *Cf.* Schmidt, Brown, and Lang, 1910.
[4] Strehlow, *Die Aranda, Frankfurt; Man*, 1909, 14 and 23.
[5] Hodson, *Naga Tribes, Manipur*, 1911; Giles, *Civilization of China*, 1911.
[6] Sapper, *Arch. f. Anthrop.*, 1905.
[7] Pinches, *Babylonia and Assyria.*
[8] Budge, *Osiris and Egypt; Man*, 1912, 61.
[9] Swanton, Bur. Am. Ethn., 43, 1911.
[10] Crawford, *Man*, 1909, 30.
[11] Sternberg, *Arch. f. Anthrop.*, 1907.
[12] Solberg, *Arch. f. Anthrop.*, 1905-06.
[13] Fowke, Bur. Am. Ethn., Bull. 37, 1910.
[14] Bryce, *South America*, 1912.
[15] Rascher, *Arch. f. Anthrop.*, 1903-04.
[16] Koch Grünberg, *Arch. f. Anthrop.*, 1909.
[17] Evans, *Archæol.*, 1905, lix., pt. 2.
[18] Hardenberg, *Man*, 1910, 68.
[19] Playfair, *Man*, 1910, 43.
[20] Luquet, in a careful examination of all the human figures of Magdalenian age, comes to this conclusion (*L'Anthropologie*, 1910).
[21] Seyffert, *Arch. f. Anthrop.*, 1911.
[22] Ishmael, *Man*, 1910, 68.
[23] *Ibid.*
[24] Gowland quotes this from Aston, *Nihongé*, vol. i.
[25] Emerson, Bur. Am. Ethn., 38, 1909.
[26] *Trading in Early Days.* Halifax, 1908.

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